ATTACHMENT 14

~~Demilitarization~~ Miscellaneous Treatment Units

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List of Acronyms

ACAMS	Automatic Continuous Air Monitoring System
ACS	Agent Collection System
AQS	Agent Quantification System
BDS	Bulk Drain Station
BRS	Burster Removal Station
BSRM	Burster Size Reduction Machine
CCTV	Closed Circuit Television
CHB	Container Handling Building
CON	Control Room
CWC	Chemical Weapons Convention
DCD	Deseret Chemical Depot
DFS	Deactivation Furnace System
DS	Discharge/Output Station
DSHW	Division of Solid and Hazardous Waste
DTS	Drain Tube System
DVS	Drum Ventilation System
DVSSR	Drum Ventilation System Sorting Room
ECR	Explosive Containment Room
ECV	Explosive Containment Room Vestibule
FCC	Facility Construction Certification
HTS	Heel Transfer System
HVAC	Heating, Ventilation, and Air Conditioning System
IS	Infeed/Transfer Station
LIC	Liquid Incinerator
MDB	Munitions Demilitarization Building
MDM	Multipurpose Demilitarization Machine
MPB	Munitions Processing Bay
MPF	Metal Parts Furnace
MPRS	Miscellaneous Parts Removal Station
NAAQS	National Ambient Air Quality Standards
NCRS	Nose Closure Removal Station
NO_x	Nitrogen Oxides
O_3	Ozone
ONC	Onsite Container
PHS	Projectile/Mortar Handling System
PLC	Programmable Logic Controller
PM_{10}	Particles Less Than 10 Microns in Aerodynamic Diameter
PMD	Projectile/Mortar Disassembly Machine
PPE	Personal Protective Equipment
PPM	Pick and Place Machine
RCRA	Resource Conservation and Recovery Act
RDS	Rinse and Drain Station
SDS	Spent Decontamination System
SO_2	Sulfur Dioxide
TOCDF	Tooele Chemical Agent Disposal Facility
TSP	Total Suspended Particles
UPA	Unpack Area

14.1 Description of Miscellaneous Units

14.1.1 The miscellaneous units addressed in this attachment are:

14.1.1.1 Reserved
14.1.1.2 Bulk Drain Station (BDS)
14.1.1.3 Projectile/Mortar Disassembly Machine (PMD), including the Multi-position Loader.
14.1.1.4 Multipurpose Demilitarization Machine (MDM), including the Pick and Place Machine.
14.1.1.5 Reserved
14.1.1.6 Air Operated Remote Ordnance Access System (Cutter Machine)
14.1.1.7 DVS (DVS Enclosure 101, DVS Enclosure 102 and the DVSSR)
14.1.1.8 Autoclave

14.1.2 These units do not fit the definition of a container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, or underground injection well. Therefore, these units are categorized as miscellaneous units. The miscellaneous treatment units listed above will be used to treat the following items:

14.1.2.1 Reserved
14.1.2.2 Explosive components from munitions
14.1.2.3 Reserved
14.1.2.4 Reserved
14.1.2.5 Ton containers (BDS)
14.1.2.6 Reserved
14.1.2.7 M104, M110 projectiles, 155mm (PMD and MDM)
14.1.2.8 M2 and M2A1 mortar cartridges, 4.2-inch (PMD and MDM).
14.1.2.9 TOCDF-Generated Secondary Waste (DVS and Autoclave)
~~Reserved~~

14.1.3 Reserved

14.1.4 The treatment objective for the BDS is to separate the liquid agent from its container and send the agent to the ACS and the bulk item casing containing a solid and liquid residue heel to the Metal Parts Furnace (MPF) for further treatment.

14.1.5 The treatment objective for the PMD is to separate, as applicable, explosive and miscellaneous components and bursters from the munitions and send the burster to the BSRM for further treatment. All miscellaneous and explosive components and bursters are sent to the DFS for further treatment.

14.1.6 The treatment objective for the MDM is to separate the liquid agent from the munition and send the agent to the ACS and the casing to the MPF for further treatment. For mustard 155mm projectiles, the treatment objective for the MDM is only to breach the agent cavity by collapsing the burster well downward into the projectile body. No agent will be removed from these projectiles.

14.1.7 Reserved

14.1.8 The treatment objective for the Cutter Machine is to gain access to the interior components of overpacked/reject munitions or other cylindrical items so that the liquid agent can be sent to the ACS or SDS for further processing, and the metal components to the MPF or DFS (if energetically configured) for further treatment.

14.1.9 The treatment objective for the DVS (i.e., the Enclosures and the DVSSR) is to treat agent contamination that exists on secondary waste by decontamination with an approved decontaminant (NaOH or Bleach) for the applicable agent type (e.g., GB, VX, Mustard) for reducing the level of PPE necessary for further treatment activities in the Autoclave. Treatment applicable to waste codes other than P999 is NOT with the objective of the DVS.

14.1.10 The treatment objective for the Autoclave is the removal and destruction of the agent contaminating secondary waste through the application of pressurized steam.

14.2 Reserved

14.3. BULK DRAIN STATION

14.3.1 Physical Characteristics

14.3.1.1 The TOCDF bulk item processing system, which includes two BDSs, is designed to safely remove liquid agent, including liquefied solid agent heel, from ton containers. Following removal of the liquid agent, the ton container is sent to the MPF for further treatment. The liquid chemical agent is collected by the ACS, a separate system that includes the agent holding tanks, associated pumps, valves, piping, and other ancillary equipment. The drained agent is then incinerated in the LICs. Solid agent heel that has been liquefied at the HTS is transferred to a separate container and incinerated in the MPF.

14.3.1.2 The BDS processes munitions that are not configured with explosives, propellants, or other energetics, so the processing system is only concerned with separating the chemical agent from the munition or bulk item. The BDSs are designed to 1) punch a hole in munitions or bulk items, 2) drain the liquid chemical agent from them, and 3) liquefy a portion of the solid agent heel and transfer the liquefied agent heel to a separate container. The following munitions and bulk items are processed on the BDS:

14.3.1.2.1 Ton containers.

14.3.1.3 The BDS begins at the munitions demilitarization gates, where the munitions are transferred from the Upper Munitions Corridor into the MPB onto the BDS Indexing Hydraulic Conveyor. It ends where the BDS Hydraulic Conveyor transfers the bulk item to a series of three MDM Indexing Hydraulic Conveyors that leads through two other indexing conveyors to the Lift Car Assembly at the far end of the MPB. Eventually, the bulk items are transferred to the MPF for thermal treatment.

14.3.1.4 Equipment Installation

14.3.1.4.1 The equipment that constitutes the bulk item processing system has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the bulk item processing system equipment has been installed in accordance with the equipment's design specification and drawings, as stated in the permit.

14.3.1.5 Dimensions and Location

14.3.1.5.1 Each BDS is approximately 17 feet long, eight feet wide and 10 feet high. The approximate nominal weight of each BDS is 16,500 pounds. The conveyors and HTS, which are an integral part of each BDS, are 17 feet long, five feet wide, and three feet high. They weigh approximately 3,000 pounds each. The BDSs are located on the second floor of the MDB in the MPB.

14.3.1.6 Conveyors

14.3.1.6.1 The BDS consists of a Munitions Transfer Conveyor, Main Frame Assembly, a Punch and Drain Station, and an HTS Rinse and Drain Station (RDS). The munitions and bulk items are transferred to the BDS in specially designed cradles that are mounted on MPF trays.

14.3.1.7 Gates

14.3.1.7.1 The cradles/trays are transferred automatically from the MDM Feed Conveyor in the Upper Munitions Corridor into the MPB through one of two MPB gates. The gates are opened to receive bulk items and they will not close until the bulk item is transferred completely into the MPB (see Section 14.3.2.9 on interlocks).

14.3.1.8 Pump and Transfer Lines

14.3.1.8.1 Each BDS's ACS is equipped with pumps to remove agent from the bulk items. The agent is transferred from the BDS through lines connecting the pumps to the ACS and to the agent holding tanks.

14.3.1.8.2 The two BDS RDSs share a common transfer line that enables the transfer of liquefied heel material from one BDS's RDS to the other BDS's RDS. The fluid transfer is performed through the use of a transfer pump located at the sending RDS (e.g., the RDS at the Parent TC).

14.3.1.9 Tanks and Containers

14.3.1.9.1 There are no tanks or containers directly associated with the BDSs. Liquid agent from the BDS DTS is pumped directly to the ACS Tanks. Liquefied heel material from the BDS RDS is pumped directly to a container staged at the opposite BDS RDS.

14.3.1.10 Feed System

14.3.1.10.1 The BDS Main Frame Assembly, which is constructed of steel, supports the conveyors, sensors, hydraulic apparatus, punch, drain tube apparatus, and other ancillary equipment associated with the BDS.

14.3.1.10.2 The bulk items (including the cradle and tray) are weighed before and after the agent draining process to obtain the initial full weight and final drained weight of the items. A set of load cells, mounted on hydraulic cylinders in the Munitions Transfer Conveyor, are designed to accomplish this.

14.3.1.10.3 The Punch Station consists of a hydraulic cylinder equipped with a punch and hold-down clamp. The hydraulic cylinder is mounted vertically on the upper front of the BDS column assembly, which stands next to the conveyor (toward the center of the MPB) so

that the Punch is suspended over the center line of the conveyor. When extended, the cylinder punches a hole through the top of the munition or bulk item. The punch is mounted at the top of the column when processing ton containers. Two position switches on the cylinder sense the position of the punch (retracted or extended).

14.3.1.10.4 The BDS hold-down clamp is mounted on the hold-down support assembly, below the punch cylinder. It consists of two small hydraulic cylinders, one on each side of the punch, that extend a hold-down clamp near the surface of the bulk item. The hold-down clamp prevents excessive lifting or rolling of the munition or bulk item in place when the punch is retracted. The hold-down clamp cylinders are actuated by hydraulic fluid from the same control valve as the conveyor lift cylinders.

14.3.1.10.5 The Drain Station consists of an agent drain tube that is lowered into the bulk item through the hole made by the punch. A position switch provides indication of an "on-bottom" condition when a solid layer is encountered. The amount of agent removed is quantified at the Drain Station by the use of before and after agent drain weights. A bubbler provides verification of the liquid level in the bulk container.

14.3.1.10.6 Reserved

14.3.1.10.7 The draining of mustard ton containers at the DTS is performed using qualitative information gained through the approximate measurement of the solid residue heel that took place prior to TOCDF receipt of the ton containers and from historical tare weights and final weights.

14.3.1.10.8 The transfer of liquefied heel material from one TC to another container staged at the opposite BDS RDS is performed using quantitative information regarding the weight of TC contents necessary to be removed from the TC in order to render the Parent TC treatable in the MPF. In addition, the Child Container (i.e., the container staged at the opposite BDS RDS that receives the liquefied heel material) net weight is ensured to be less than the maximum allowable to the MPF. The target weights for both the Child Container and the Parent TC are, in part, based on the most efficient use of the MPF and are subject to adjustment in order to respond to changing plant conditions.

14.3.1.11 Instrumentation

14.3.1.11.1 Instrumentation associated with the BDSs is remotely monitored in the TOCDF CON. The instruments are primarily associated with the hydraulic and pneumatic systems, electronic position sensors, load cells, drain verification system, and interlocks. Table 14-3-1[1] summarizes the various sensors for the BDS and their function. Details of the instruments and sensors are shown on drawings contained in Attachment 11 (General Facility Drawings).

14.3.1.12 Electrical System

14.3.1.12.1 The electrical power supply and distribution network for the process systems are provided by the local utility and by the installation. Electrical power has been extended to the MDB complex as part of the site development. Additionally, there are two backup

[1] All tables are located at the end of this Attachment.

power systems: essential and uninterruptible. Attachment 9 (Contingency Plan) provides detailed information regarding the backup power systems.

14.3.1.13 Heating, Ventilation, and Air Conditioning System (HVAC)

14.3.1.13.1 The HVAC system for the MDB consists of a once-through cascade system servicing the MDB process areas, a stand-alone HVAC system servicing the MDB CON, and miscellaneous HVAC systems servicing the Category D areas. The primary means of preventing the release or spread of contamination is through the use of cascaded pressure control. The CON is maintained at a positive pressure with respect to the atmosphere, while toxic areas are maintained at a negative pressure with respect to the atmosphere. This ensures a flow of air from the cleanest areas to areas with ascending potential for higher contamination.

14.3.1.13.2 Each room in the MDB has a designated category rating of A, A/B, B, C, D, or E based upon the potential for agent contamination. Rooms assigned a Category A rating (negative pressure), like the ECRs, are routinely contaminated by either agent liquid or vapor. Rooms with a Category B rating (negative pressure) have a high probability of agent vapor contamination resulting from routine operations. Rooms with a Category C rating (negative pressure) have a low probability of agent vapor contamination. Rooms with a Category D rating (atmospheric pressure) have a very remote probability of ever being contaminated by agent. Rooms with a Category E rating (positive pressure) are maintained from being contaminated by agent at all times.

14.3.1.13.3 The control of pressure for the incinerator rooms is accomplished by the control system. The pressure for the other rooms is balanced manually before facility start. The airflow and pressure differentials are regulated manually by fixed balancing dampers to maintain the desired negative environment in the MDB. Isolation dampers are located between Category A, A/B, or B rooms and Category C rooms to prevent possible migration of chemical agent to a lower contamination category area in case of an agent spill and a power failure. These isolation dampers are designed to fail closed.

14.3.1.13.4 Three air handling units supply air to all Category A, A/B, B, and C rooms in the MDB. During normal processing, two air-handling units are online, with the third air-handling unit serving as a spare. Conditioned air is supplied to the air supply-handling units. The filters on the inlet of the air-handling unit are used to remove dust contained in the air. The units have heating coils that are supplied by hot water for use in the winter and cooling coils supplied by chilled water for use in the summer. Outside air flowing across the coils is either heated or cooled. A blower on the unit is used to pull air from outside and deliver the air to the building rooms.

14.3.1.13.5 Air removed from the MPB is exhausted to air filtration units. The MPB is maintained at a negative pressure of approximately 1.8 inches of water column. The exhaust air filtration units contain filter media (carbon adsorption units) used to ensure that agent is not released to the environment.

14.3.1.13.6 Air removed from the ECRs is exhausted to air filtration units. The ECRs are maintained at a negative pressure of approximately 2.0 inches of water column. The exhaust air filtration units contain filter media (carbon adsorption units) used to ensure that agent is not released to the environment.

14.3.1.13.7 Each exhaust filtration unit has ACAMS ports to detect agent breakthrough and send an alarm to the CON for the current agent campaign. The ACAMS sample as described in Attachment 22 (Agent Monitoring Plan).

14.3.1.13.8 Each exhaust filter unit is provided with a centrifugal fan that discharges the air to the atmosphere through an exhaust stack. Air flows through each exhaust filtration unit with a range of 12,200 to 16,000 cubic feet per minute. Air exhausted through the stack is monitored for the presence of GB, VX, and mustard chemical agent.

14.3.1.14 Fire Protection System

14.3.1.14.1 The fire protection system in the MPB consists of thermal (heat) detectors and fire dampers. There are 28 thermal (heat) detectors mounted on the ceiling and 10 on the underside of the platform of the MPB. There are five manual pull fire alarms in the MPB.

14.3.1.14.2 As mentioned above, fire dampers are provided in ducts passing through fire-rated walls and ducts serving the MDB. The fire dampers restrict fire propagation in the building through the ventilation air ducts.

14.3.1.15 Alarm and Communication Systems

14.3.1.15.1 The MDB is equipped with telephones for TOCDF-wide communication. Personnel will be able to use this system to summon assistance in an emergency. The MPB is equipped with horn speakers and CCTV so that the CON operator can visually observe the operations in the MPB and notify facility personnel in the event of an emergency. Fire alarms, initiated by the automatic heat detection system or the manual pull stations, are described above. Also, instrumentation alarms will send signals to the CON.

14.3.2 Operations and Maintenance

14.3.2.1 Munitions and bulk items to be processed at the BDS are received from the Upper Munitions Corridor, and transferred to the MPB. As the conveyor moves the bulk item(s) to the correct position under each station, the BDS punches and drains the bulk item. Mustard TCs that are to have their contents transferred to another container staged at the opposite BDS are transferred to the BDS RDS. For bulk items previously verified as drained prior to arrival at the BDS, the BDS drain and RDS sequence may be bypassed.

14.3.2.2 As mentioned previously, all munitions are received and processed in cradles that are mounted on MPF trays. Ton containers are received one at a time. The following section further describes the operating sequence for bulk items processing at the BDS.

14.3.2.3 The BDS is designed to receive bulk items and treat and forward the drained bulk containers to the MPF. The MPF maximum feed rates are specified in this Permit. Upon reaching the BDS, each bulk item waste will have been identified. Physical and chemical characteristics of each waste are summarized in Attachment 2 (Waste Analysis Plan).

14.3.2.4 Reserved

14.3.2.5 General System Operation

14.3.2.5.1 Reserved

14.3.2.5.2 Operating Description: Ton Container

14.3.2.5.2.1 At the BDS, ton containers are punched, drained of liquid agent, and punched again at least once. The ton containers are moved to the punch position by the indexing hydraulic conveyor. Proximity switches detect flags located on the side of the cradles which position the cradle for punching and draining. When the bulk item is stopped at the punch position, the indexing conveyor lowers allowing the cradle/tray to rest on the main frame anvils. Simultaneously, the hold-down cylinders extend to prevent excessive lifting or rolling of the bulk item. The Punch then extends, creating a hole in the bulk item. When punching is complete, the punch cylinder retracts, the transfer conveyor raises, the hold-down cylinders retract, and the bulk item moves to the drain position. For bulk items previously verified as drained prior to arrival at the BDS, the BDS drain sequence may be bypassed.

14.3.2.5.2.2 Prior to draining (and after punching), the indexing hydraulic conveyor, tray, cradle, and munition/bulk item are raised hydraulically off the anvil and weighed by a set of four Load Cells. These cells are located under each corner of the conveyor and are mounted on the hydraulic cylinders that raise the conveyor. Weighing is accomplished electronically by actuating the Load Cells (conveyor in raised position). The weight is recorded by the PLC.

14.3.2.5.2.3 A drain tube is lowered into the punched hole on the bulk item at the Drain Station. The tube then extends until it reaches an operator-entered depth inside the interior of the bulk item or until the solid is detected. Draining starts after the bubbler system verifies the presence of liquid chemical agent. The bulk item is drained to ensure all but residual chemical agent and solid residue have been removed. After the drain tube retracts, the bulk item is re-weighed by the Load Cells. By comparing the full and drained weights, the amount of chemical agent removed is obtained. The indexing conveyor then moves the bulk item to the correct position for punching at least once more vent hole, the conveyor and hold-down clamp lower, a vent hole is punched (the same size as the drain hole), and the conveyor and hold-down clamp raise. If the bulk item is considered sufficiently drained the bulk item (with cradle/tray) is then transferred to the MDM Indexing Hydraulic Conveyors that deliver the cradle to the opposite end of the MPB.

14.3.2.5.2.4 If the bulk item is a Mustard TC to have additional heel material removed from it using the HTS, the “Parent TC” is moved to the correct position at the RDS for the water spray sequence. The high-pressure water spray wand is inserted into the TC and actuated to inject a predetermined amount of hot water. After a soaking period, the spray wand is retracted from the bulk item and the TC is moved to the correct position for the heel transfer sequence. After staging a “Child Container” at the opposite BDS RDS as a receiving vessel, both the Child Container drain tube and the Parent TC drain tube are inserted into their respective containers. Liquefied heel material is transferred from the Parent TC to the Child Container by the Parent TC’s HTS pump.

14.3.2.6 Setup Procedures

14.3.2.6.1 The BDS is initialized before being placed in service. All major system components are remotely activated from the CON, and the PLCs verify the proper operation of the system. The indicators in the CON are observed to verify the status of the BDS. The BDS major system components are turned off, and the initialization procedure is completed. At this point, the BDS is ready to receive a start command from the CON.

14.3.2.7 System Startup

14.3.2.7.1 The procedures for BDS startup are contained in the appropriate BDS system standard operating procedures document. In summary, the systems are started by placing Line A and B BDSs in automatic mode, selecting the type of agent and bulk item to be processed, and then pressing the initialization start icon. This is accomplished remotely in the control room. When the control room display system start/stop icon changes from flashing to steady green, the processing lines are ready to accept bulk items.

14.3.2.8 Feed

14.3.2.8.1 Waste quantification requirements are met when the weighing operation is performed at the BDS. These various activities are recorded either manually, or by the PDARS, and such records will be available at the plant in the facility Operating Record.

14.3.2.8.2 Alternatively, during baseline ton container processing, waste quantification may be met using the programmed levels associated with the BDS Drain Tube System (DTS) and the systems integrated bubbler provided the Executive Secretary approves the heel weight/heel depth correlation developed during the Mustard Baseline Shakedown Period as allowed per Permit Condition VI.C.1.a.v.

14.3.2.9 Interlock Processes

14.3.2.9.1 The BDS is operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the BDS do not interfere with each other or operate in a manner that is unsafe to human life or harmful to the environment. The interlocks remain in place during manual operations.

14.3.2.9.2 Should the BDS machine malfunction, the demilitarization line will stop until the problem is corrected. The process step being performed by the BDS is displayed on the CON screen so that the operator can determine which process sequence step was not completed. The BDS cannot be started again until the problem is corrected because the system is interlocked (in a fail safe mode). The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.3.2.9.3 There are two interlocks associated with the BDS operations that are activated by sensors P2 and P5 (see Table 14-3-1 for a description of these sensors). When a munition and cradle/tray are being transferred from the Munitions Corridor to the MPB through the munitions demilitarization gates, the gate will remain open and interlocked until the cradle/tray arrives at the BDS Punch Station. Sensor P2 detects the presence of the cradle/tray at the Punch Station and allows the gate to close.

14.3.2.9.4 After a munition has been processed at the BDS, it passes sensor P5, a retroreflective sensor, which signals that the cradle/tray is being transferred to the next conveyor. If another munition is waiting in the Munitions Corridor at the munitions demilitarization gates, and no BDS (or MDM) processing is being conducted, the gate(s) will open to allow the next cradle/tray into the MPB.

14.3.2.10 System Shutdown (Normal)

14.3.2.10.1 After the stop command has been issued, the BDS is "parked." When the BDS is parked, it is configured so that the conveyor lift table, hold-down cylinders, and punch cylinder are extended; this is the fail-safe mode.

14.3.2.10.2 After the bomb and bulk item demilitarization campaigns have been completed, the BDS will no longer be needed except to transfer projectiles and mortars from the Munitions Corridor to the MDMs, which are also located in the MPB.

14.3.2.11 Emergency Shutdown

14.3.2.11.1 In the event of an abnormal or upset condition associated with the BDS, the processing operations are modified in order to mitigate the condition. Abnormal or upset conditions are any conditions that cause an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. These conditions are identified by plant personnel or indicated by the process sensors (which send signals to the CON through the PLCs). After conditions are identified, the CON issues an emergency stop command to the BDS. When this command is issued, the BDS machine components are stopped.

14.3.2.12 Extended Shutdown

14.3.2.12.1 The BDS operating procedures do not include specific steps to shut down the system for extended periods. Instead, normal shutdown procedures are followed when the BDS machines are not being used. Shutdown procedures are implemented after the BDS is parked as explained earlier.

14.3.2.13 Maintenance

14.3.2.13.1 Maintenance of the BDS machine includes preventive maintenance procedures and corrective maintenance procedures. Preventive maintenance procedures generally involve inspections, cleaning (as required), and lubricating (as required) for the BDS machine.

14.3.3 Monitoring Procedures

14.3.3.1 Each BDS is equipped with sensors to detect the presence, position, and weight of munitions and bulk items during operations. The sensors, which are connected through PLCs, ensure that the munitions and bulk items will be processed safely by relaying information to the CON.

14.3.3.2 The CON monitors the operations of the BDS through the demilitarization operator consoles and CCTV. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provide operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into logbooks.

14.3.3.3 The MPB is a Category A room, and it is expected that this area will be contaminated by agent (liquid or vapor) as part of normal operations. ACAMS are used to detect the presence of agent vapors in the MPB.

14.3.3.4 Waste Identification

14.3.3.4.1 As mentioned previously, bulk items are fully identified prior to entering the BDS. The quantity of bulk items processed by the BDS is recorded by the PDARS and maintained in a logbook by CON operators.

14.3.3.5 Waste Throughput

14.3.3.5.1 The waste entering the BDS is a bulk item. During treatment by the BDS, the liquid agent is separated from the item and handled through the ACS. The metal casing is then transported away from the BDS for thermal treatment later in the MPF. In each case, quantification of waste occurs: the agent is quantified as a result of weightings that occur before and after the agent drain process, with the weights and their difference recorded on the PDARS and in the manual record; and the metal casing is quantified through the PDARS record and by the manual record created by the CON operator who observes the BDS in operation.

14.3.4 Inspection

14.3.4.1 A TOCDF Inspection Plan is contained in Attachment 5 (Inspection Plan) of this Permit and describes inspection requirements.

14.3.4.2 The BDS, PMD, and MDM inspections prevent equipment deterioration and possible equipment malfunctions that would cause abnormal or upset conditions. The inspections are designed to reduce the potential impacts of operations on human health and the environment. In addition to daily inspections, the BDS, PMD, and MDM will be monitored remotely by CCTV throughout operations.

14.3.5 Closure

14.3.5.1 Partial Closure

14.3.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the BDSs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; all clouded observation windows that compromise the ability to view operations shall be cleaned or replaced; and maintenance and repair will be performed, as necessary, on the machines and other room components. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure from Executive Secretary, the next campaign will commence when authorized and when it is appropriate to do so.

14.3.5.2 Final Closure

14.3.5.2.1 Final closure is addressed in Attachment 10 (Closure Plan).

14.3.6 Mitigative Design and Operating Standards

14.3.6.1 The BDS machines are designed for demilitarization purposes and do not contain inherent components to mitigate the potential for waste migration to the environment.

However, the MPB was designed for this purpose. The MPB will be operated in a manner to reduce the risk of waste constituent migration to the environment.

14.3.6.2 The floor of the MPB is impervious and sloped to drain any spills to sumps located in the floor. Protective clothing is mandatory during cleanup of spilled agent in the room, and care is taken to reduce the potential for spills.

14.3.6.3 The MPB will not contain explosively configured munitions. Therefore, the room is not designed for, nor expected to incur, an explosion during munitions demilitarization. However, if an accident occurs, air from the MPB would be captured by the MDB ventilation filter system and not escape to the atmosphere.

14.3.7 Environmental Performance Standards for Miscellaneous Units

14.3.7.1 The BDS has been designed, installed, and will be operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. The following section describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.3.7.2 Miscellaneous Unit Wastes

14.3.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the BDS are associated with bulk item storage containers (such as ton containers). These wastes have been fully identified, and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.3.7.2.2 The maximum number of bulk items in the MPB at any time is equal to the number of munitions in eight cradles/trays (one cradle/tray per conveyor section). Therefore, up to eight ton containers could be in the MPB at one time.

14.3.7.2.3 The maximum volume of agent processed in the MPB is equivalent to the number of munitions in each cradle/tray at the BDS. For example, only one ton container may be processed at the BDS at a time. Therefore, during ton container processing, the maximum volume of waste at the BDS is equivalent to the agent in the ton container and the ton container itself. The maximum number of munitions and/or bulk items in the MPB that contain agent is equivalent to two cradle/trays (one per processing line). Therefore, up to two ton containers containing agent could be at the BDS at one time.

14.3.7.3 Containment System

14.3.7.3.1 The seven sumps located in the MPB are primary containment sumps. Some of the sumps have trenches that aid in collecting spills. The dimensions of three of the seven sumps are approximately 2.33 by 2.33 by 2.25 feet with a capacity of about 89 gallons each. Three of the remaining sumps are approximately 2.33 by 2.33 by 1.71 feet with a capacity of about 69 gallons and one is 2.33 by 2.33 by 1.46 feet with a capacity of 59 gallons (a total combined capacity of approximately 533 gallons not including the trench volume). The outer portion of each sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The sumps are constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The concrete is designed to be free from cracks or gaps.

14.3.7.3.2 Each sump metal internal liner is equipped with a level sensor probe to detect liquid. The level sensor is screwed into a coupling that is welded into the mounting flange of the metal liner. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner is sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for liquid detection within 24 hours of occurrence.

14.3.7.3.3 As mentioned previously, the maximum number of munitions filled with agent in the MPB at any time is:

14.3.7.3.3.1 Two ton containers.

14.3.7.3.4 Additional quantities of the above munitions or bulk items can be in the MPB at any given time; however, the maximum number of agent-containing bulk items is limited to those being processed at the BDSs. The maximum quantity of agent in munitions being processed is associated with the ton containers (two ton containers hold up to approximately 380 gallons of agent). In the event both ton containers leak or both are ruptured and all the agent spills onto the floor of the MPB, the sumps will be able to hold all the spilled liquid.

14.3.7.3.5 Material in the sumps will be removed within 24 hours of detection. The liner will then be decontaminated, as necessary, and rinsed. All rinsing materials will be collected and transferred to the SDS.

14.3.7.3.6 In addition to the sumps, the MPB contains curbed walls so that liquid spills and decontamination solution will not leak under doors and gates. The floors and walls are painted with epoxy chemical-agent resistant paints to aid in decontamination.

14.3.7.4 Site Air Conditions

14.3.7.4.1 The following paragraphs describe the potential impacts of air emissions due to operation of the BDSs, PMDs, and the MDMs. A brief description of topographic and meteorologic characteristics of the Tooele area are presented as well as a summary of potential impacts on existing air quality in the Tooele region.

14.3.7.5 Topography

14.3.7.5.1 The DCD is located in Tooele County in the northwest portion of the State of Utah. The DCD spreads out over 19,364 acres in the middle of Rush Valley. Attachment 1 (Facility Description) provides detailed information regarding topography.

14. 3.7.6 Meteorologic and Atmospheric Conditions

14. 3.7.6.1 The climate around TOCDF is characteristic of semi-arid continental regions. Attachment 1 (Facility Description) provides additional information regarding meterologic and atmospheric conditions.

14.3.7.7 Air Quality

14.3.7.7.1 The TOCDF is located south of the Great Salt Lake Air Basin in the area designated by the EPA as the Wasatch Front Intrastate Air Quality Control Region [Title 40, Code of

Federal Regulations (CFR) Part 81.52]. This region has been designated by the EPA as meeting all regulated pollutant National Ambient Air Quality Standards (NAAQS).

14.3.7.7.2 Historically, ambient monitoring at DCD has been conducted for sulfur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3), total suspended particulates (TSP), and particulates less than 10 microns in aerodynamic diameter (PM_{10}). No exceedance of existing state and Federal NAAQS has been observed at DCD. The DCD also has a network of agent monitors around the TOCDF.

14.3.7.7.3 Any air emissions from the demilitarization machines located in the ECRs or MPB are captured by the MDB ventilation system and processed through the MDB carbon filter system before being exhausted to the HVAC stack.

14.3.7.8 Prevention of Air Emissions

14.3.7.8.1 The BDSs, PMDs, and MDMs/PPMs, are not sources of air emissions in and of themselves, but they are associated with treatment operations that could potentially emit air pollutants. For example, the BDS or MDM agent draining process could potentially release small quantities of agent due to evaporation. For the purposes of analyzing potential air emissions from these machines, it is assumed that the machines and ancillary equipment associated with the machines (e.g., piping and sumps), are the sources of pollutants. These air emissions will occur as part of normal TOCDF operations.

14.3.7.8.2 When the munitions are brought to the ECRs or the MPB, the munitions have already been identified, so the type of propellant, explosive, miscellaneous materials and agent being drained from the munitions and bulk items is known. Physical and chemical characteristics of each waste are summarized in Attachment 2 (Waste Analysis Plan), and are not reproduced here.

14.3.7.8.3 Potential sources of air emissions from the BDSs, PMDs, and MDMs, include agent, decontamination solution, and possibly metal particulates (from the shearing and cutting processes). Emissions of agent are predicted to occur due to vaporization.

14.3.7.8.4 Emissions of decontamination solution, which is a water-based cleaning solution, are predicted to result from evaporative processes. However, the vapor pressure of this solution (containing mostly water) at the conditions within the ECR or MPB is low; therefore, evaporative emissions are expected to be negligible.

14.3.7.8.5 Emissions of metal particulates in the MPB are also expected to be negligible because the bulk munitions are penetrated with a metal punch and no fragmenting is anticipated.

14.3.7.9 Operating Standards

14.3.7.9.1 The MPB is a Category A area and is under engineering controls at all times, as previously discussed. Liquid wastes are captured and controlled in the containment system, air emissions are controlled by the HVAC system and cleaned through filters, and the BDS operations are continuously monitored by the CON and PDARS. As a result, there is virtually no opportunity for the waste constituents to be released in such a way as to have adverse effects on human health or the environment due to migration into the outdoor environment. The liquids are placed in tanks or, if spilled, are contained in sumps and from there placed in tanks. Volatilized agent is captured by the HVAC system, primarily in carbon beds. The BDS itself is operated in a systematic and safe

manner whether in automatic or manual mode, thereby reducing the potential for agent to be released and migrate into the air.

14.3.7.10 Site Hydrologic Conditions

14.3.7.10.1 A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.3.7.11 Migration of Waste Constituents

14.3.7.11.1 Migration of munition or bulk item wastes into the environment from BDS, PMD, or MDM operations is not expected to occur. Therefore, no impacts on human health and the environment from the BDSs, PMDs, or MDMs are expected.

14.4 PROJECTILE/MORTAR DISASSEMBLY MACHINE

14.4.1 Physical Characteristics

14.4.1.1 The PMD is part of the Projectile/Mortar Handling System (PHS). The PHS is designed to safely separate explosives and miscellaneous parts (fuze well cups, supplementary charges, and cardboard spacers) from 155mm projectiles and 4.2-inch mortars. The PHS includes conveyors that transport the projectiles/mortars from the MDB UPA, through the ECV, to the ECRs where the PMDs are used to remove the explosive components from the projectiles/mortars. Next, the explosive and miscellaneous components are fed into the DFS for thermal destruction, and the projectile/mortar bodies are transferred to the MDM for chemical agent removal. After the chemical agent is removed, the projectile/mortar bodies are thermally treated in the MPF. Finally, the drained chemical agent is incinerated in one of the two LICs. The process differs for the mustard 155mm projectiles, the projectiles will only have their burster wells crushed down into the projectile at the MDM and then will be thermally treated in the MPF.

14.4.1.2 The PHS consists of two identical process lines designed to operate simultaneously. Both projectile/mortar processing lines (A and B) are located on the second floor of the MDB. Each line consists of several conveyors and a PMD. The Projectile Feed Conveyors and Projectile Discharge Conveyors for process lines A and B will be included with the discussion of the PMD. These conveyors are not considered part of the PMD, but they are included because they represent the beginning and end of the PMD treatment process.

14.4.1.3 Equipment Installation

14.4.1.3.1 The equipment that constitutes the PMD-101 and PMD-102 has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the PMD equipment has been installed in accordance with the equipment's design specifications and drawings, as stated in this Permit.

14.4.1.4 Dimensions and Location

14.4.1.4.1 The approximate size of the PMD is 13 feet long by 11 feet wide by seven feet high. Most of the machine components are nickel-plated, and others are coated with a corrosion resistant epoxy paint to protect against the corrosive action of the decontamination solutions used at the facility.

14.4.1.4.2 The PMDs are located inside ECRs A and B. To provide effective containment in the event of any spills, leaks, or explosions, the ECRs have been equipped with blast doors and blast gates that remain closed while operations are taking place. Furthermore, each ECR is provided with a containment sump, and the air from the rooms is cycled through a closed ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, each ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene. To ensure that this design limit is not exceeded, the number of munitions in the ECR is limited. See Table 14-4-1[2] for the maximum number of munitions allowed into the ECR.

14.4.1.5 Conveyors

14.4.1.5.1 The projectile feed conveyors are made of steel and have dimensions of approximately 4.75 feet long and 1.33 feet wide. The projectile discharge conveyors are also made of steel and have dimensions of approximately 11.13 feet long and 1.33 feet wide.

14.4.1.5.2 For process line A, the projectile feed conveyor and the projectile discharge conveyor are located inside ECR A. For process line B, the projectile feed conveyor and the projectile discharge conveyor are located inside ECR B.

14.4.1.6 Gates

14.4.1.6.1 The projectiles/mortars are transferred automatically from the ECV into ECR A or B through munition access blast gates. After the projectiles/mortars are processed by the PMDs, they are transferred out of ECR A or B through a discharge blast gate. These gates will not close until a projectile/mortar is transferred completely into or out of the ECRs.

14.4.1.7 Pumps and Transfer Lines

14.4.1.7.1 PMDs do not drain the chemical agent out of the projectiles/mortars, thus there are no pumps or chemical agent transfer lines associated with the PMDs.

14.4.1.8 Sump Pump

14.4.1.8.1 Each of the two ECRs is provided with a containment sump. Each sump is serviced by a sump pump located in the Munitions Corridor. Sump pump operation is controlled by a local-off-remote switch and must be designated by the toxic area entrant for either local (local manual) or remote (level-controlled) operation. When a sump level alarm is sent to the CON, the liquids collected in the sump are pumped to a spent decontamination holding tank.

14.4.1.9 Tanks and Containers

14.4.1.9.1 There are no tanks or containers directly associated with the PMDs as they are being addressed in this Permit. Chemical agent is drained in the MDM and then pumped directly to the ACS, except for the mustard 155mm projectiles which will not be drained

[2] All tables are located at the end of this Attachment.

prior to thermal treatment in the MPF. Only minor amounts of froth will enter the ACS from the processing of these projectiles

14.4.1.10 Feed System

14.4.1.10.1 This section covers the feed system of one PHS; operation of the second system is identical. The feed rate of projectiles/mortars to the ECR varies according to the type and the amount of explosive fed to the DFS. One projectile/mortar system is coordinated with the other to ensure that the explosive limit of the DFS is not exceeded.

14.4.1.10.2 After confirmation of correct lot number and quantity of munitions, a signal is given to the UPA operator to load projectiles/mortars onto the UPA Projectile/Mortar Feed Conveyor. When this operation is complete, the operator signals the CON system and CON operator that loading is complete. The CON operator then initiates the start of processing the projectile/mortar.

14.4.1.10.3 The following conditions must be met before commencement of operation:

14.4.1.10.3.1 Feed conveyors are continuously running
14.4.1.10.3.2 Stops on the conveyors are retracted
14.4.1.10.3.3 ECR munition access blast gate is open.

14.4.1.10.4 When these have been confirmed, the orientation of the projectile/mortar is checked. If it is found that the projectile/mortar was loaded backwards, the UPA operator will reload the projectile/mortar in the correct orientation. The projectile/mortar is conveyed onto the feeder in the ECR. The feeder loads the projectile/mortar onto the Index Table, and the table is rotated. At this time a second projectile/mortar, if properly oriented, is loaded onto the conveyor system and is conveyed into the ECR to be loaded onto the Index Table. At this point, the munition access blast gate closes and the first operation of the explosive removal process commences.

14.4.1.11 Instrumentation

14.4.1.11.1 The PMD is operated by PLCs. The PLCs contain the controls and instruments for the PMD but are not a part of the machine. All the instrumentation installed on the machine is designed to relay information to the PLC. Also, the machine can be operated locally by setting the machines in the local mode from the PLC.

14.4.1.11.2 There is a variety of sensors installed to support the operation of the PMDs. The sensors are used to track process flow through the machine and continually update the PLC with new information. Those types of sensors include inductive proximity sensors (used to track munition movement throughout the process and to indicate the switches) and fiber-optic switches. The sensors are used to track movement throughout the process and to indicate cylinder or actuator position. A list of those sensors, their type, and a brief description of their function is provided in Table 14-4-2.

14.4.1.12 Electrical System

14.4.1.12.1 See Section 14.3.1.12.

14.4.1.13 Heating, Ventilation, and Air Conditioning System (HVAC)

14.4.1.13.1 See Section 14.3.1.13.

14.4.1.14 Fire Protection System

14.4.1.14.1 See Section 14.3.1.14.

14.4.1.15 Alarm and Communication Systems

14.4.1.15.1 See Section 14.3.1.15.

14.4.2 Operations and Maintenance

14.4.2.1 There are two systems that process non-leaking projectiles/mortars prior to the incineration. These systems operate in parallel, each in its own ECR. This description covers the operation of one processing system. Operation of the second system is identical. Both line is capable of meeting the maximum feed rate of the DFS, and the two lines are coordinated with each other. Pallets containing leaking projectiles/mortars are handled similarly to pallets without leakers, except that for sealed[3] ONCs determined, via ACAMS monitoring, to have agent levels greater than 40 VSL, munition unpacking occurs in the TMA. The process description for leaking munitions can be found in Attachment 9 (Contingency Plan).

14.4.2.2 General System Operation

14.4.2.2.1 The PMD is located in the ECR and is comprised of five major work stations: the Infeed/Transfer Station (IS), Nose Closure Removal Station (NCRS), Miscellaneous Parts Removal Station (MPRS), Burster Removal Station (BRS), and Discharge/Output Station (DS).

14.4.2.2.2 The feed of projectiles/mortars to the PMD is described in Section 14.4.1.10, "Feed System." After a projectile/mortar is successfully transferred into the ECR, the projectile feed conveyor transfers the projectile/mortar to the PMD's infeed conveyor for disassembly. The PMD infeed conveyor then transfers the projectile/mortar to the IS on the PMD Index Table and the table is rotated to the NCRS. The NCRS removes the nose closure or fuze and burster when processing mortars. Then, the Index Table rotates the projectile/mortar to the MPRS where the supplementary charge and miscellaneous parts (if any) are removed and the burster is rotated. After the operation at the MPRS is completed, the Index Table rotates to the BRS where the burster of the projectile is removed by differential air pressure. If the burster is successfully removed using differential air pressure, the Index Table then rotates again to the DS where the projectile/mortar is removed from the PMD by the projectile discharge conveyor.

14.4.2.2.2.1 If the burster cannot be successfully removed using differential air pressure, the Index Table rotates back to the PMD's infeed conveyor and the projectile is transported back into the ECV for storage. Only after the burster has been removed, the Index Table rotates to the DS where the projectile is removed from the PMD by the projectile discharge conveyor.

[3]The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

14.4.2.2.2.2 The burster-less projectile/mortar is transported from the PMD to the discharge blast gate and stop. The munition discharge blast gate opens and the stops holding the munition are retracted, allowing the projectile without explosives to transfer out of the ECR and the next projectile/mortar to travel inside the ECR.

14.4.2.2.3 The nose closure or fuze, miscellaneous parts, and the supplementary charge are deposited onto the miscellaneous parts conveyor which transfers them to the DFS feed gate for thermal destruction. The bursters are conveyed to the Burster Size Reduction machine (BSR).

14.4.2.2.4 The BSR may be adapted to receive each of the various sizes of bursters from the mustard 155mm projectiles. When configured for burster shearing, water-cooled shear blades cut the burster into pieces that fall into the DFS feed gates. Since the bursters on the 155mm M104/M110 and 4.2-inch mortars are relatively small in comparison to other munitions, and since it is open at one end, it does not require this reduction operation. Mustard 155mm bursters may be sheared in order to reduce potential jamming of the DFS heated discharge conveyor.

14.4.2.2.5 Mustard 155mm projectiles that have not been configured with energetics (i.e., non-explosive) may bypass the ECR and the PMD entirely. In this case, in lieu of using the PMD to remove the nose closures, the nose closures may be removed manually by facility personnel before transferring the projectiles to the MDM.

14.4.2.3 Setup Procedures

14.4.2.3.1 Automatic operation is the preferred mode for the startup, shutdown, and emergency shutdown of the PMDs and is to be used when possible for all operations. When the system is in automatic and remote manual from the Control Room mode, all system interlocks are automatic, causing the system to fail safe should an abnormal or upset condition occur. Both A and B lines have the same startup, shutdown, and emergency shutdown procedures. Before the startup procedures can begin, the operator must ensure the following systems are operable and online: DFS, DFS PAS, Decontamination System, SDS, Process Water System, Cooling Water System, Instrument Air System, Uninterruptible Power Supply System, Plant Air System, Secondary Power System, Primary Power System, Emergency Generator System, MDB HVAC System, ACS, and CON Console Operations.

14.4.2.4 System Startup

14.4.2.4.1 The procedures for PMDs startup are contained in the appropriate PMD system standard operating procedures document. In summary, the systems are started by selecting the type of agent and the type of munition to be processed and placing the PMD stations in automatic mode. This is done remotely by the CON operators. Before operations are commenced, a receiving tray is staged in the Upper Munitions Corridor on the Bypass Conveyor (this is where the munitions are sent after treatment at the PMD). Once these steps are performed, the PMDs are ready to begin treating munitions.

14.4.2.5 Feed

14.4.2.5.1 Prior to the projectiles/mortars arriving at the blast gate (located between the ECV and ECR and leading to the projectile input conveyor), the projectiles/mortars are identified in the storage igloo, placed in an Onsite Container (ONC) along with their pallet,

transported to the Container Handling Building (CHB), and moved to the UPA where the ONC is monitored for chemical agent. If chemical agent is detected, via ACAMS monitoring, inside the ONC, at levels less than or equal to 40VSL, the ONC is opened; the pallet is moved out into the UPA and unpacked. For non-burstered projectiles, the nose plug is either: (1) removed manually in the Upper Munitions Corridor after the munitions are loaded onto trays and the trays are transferred to the bypass conveyor and moved to the Upper Munitions Corridor. Trays are delivered to the MPB for further processing through the MDM following nose plug removal; (2) removed at the PMD; (3) removed at the MDM. For burstered projectiles and mortars, the UPA operator loads the projectile/mortar onto the UPA Projectile/Mortar Feed Conveyor. If the projectile/mortar is correctly oriented, it is then transported to the blast gate leading to the PMD. During that process, appropriate inspections and paperwork are completed to satisfy the various requirements associated with the Army Surety Program, the CWC, and hazardous waste identification and tracking requirements. Waste quantification requirements are met when the chemical agent is drained from the projectile/mortar at the MDM and pumped to the AQS. These various activities are recorded either manually, or by the PDARS, and such records will be available for scrutiny in the facility operating record.

14.4.2.6 Interlock Processes

14.4.2.6.1 The PMDs are operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the PMDs neither interfere with each other, nor operate in a manner that is unsafe to human life and health or harmful to the environment. The interlocks are ZS-139/239, 1-P1, 2-P1, and ZS-147/247. Interlocks ZS-139/239 are described in this section, 1-P1 and 2-P1 are described in Section14.4.2.7, and ZS-147/247 are described in Section 14.4.2.11. The interlocks remain in place during manual operation and also prevent operator error that could result in the machine being operated in an unsafe or unprotective manner. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.4.2.6.2 When a projectile/mortar stops just before it enters the ECR, the munition access blast gate will open and the projectile/mortar will be conveyed into the ECR. An infrared retro-reflector sensor (ZS-139 and ZS-239, for lines A and B, respectively) detects the projectile/mortar while it is passing through the blast gate. The sensor is interlocked with the munition access blast gate so that the gate remains open until the entire projectile/mortar has successfully passed through the munition access blast gate and enters the ECR.

14.4.2.6.3 Once the projectile/mortar enters the ECR, it is processed by the PMD. The projectile/mortar entering from the blast gate is transferred to the projectile feed conveyor. The projectile feed conveyor moves the projectile/mortar to the PMD Infeed/Transfer Station.

14.4.2.7 Infeed/Transfer Station

14.4.2.7.1 A sensor on the infeed conveyor (1-P1 and 2-P1, for lines A and B, respectively) detects the presence of the projectile/mortar. This sensor is interlocked with the munition access blast gate. The munition access blast gate will close when the sensor detects the projectile/mortar on the infeed conveyor. The infeed conveyor moves the projectile/mortar near the saddle on the Index Table. From this position, the Transfer

Conveyor Pusher contacts the projectile/mortar and pushes it onto the saddle. The Index Table then rotates clockwise to bring the projectile/mortar to the NCRS.

14.4.2.8 Nose Closure Removal Station (NCRS)

14.4.2.8.1 The NCRS is the number 2 processing station on the PMD. The NCRS is used to remove the nose closure or fuze from projectiles and fuzes and bursters from mortars. When a projectile/mortar is detected in the NCRS by sensor P2, the projectile is clamped. A hydraulic chuck engages and unscrews the components. The components are removed from each type of projectile/mortar as follows:

Projectile/Mortar	Removal Process
155mm	The nose closure is unscrewed and removed.
Mortars	The fuze and burster are unscrewed and removed as one unit since they are screwed together; therefore, the hydraulic chuck is needed to separate the fuze from the burster.

14.4.2.8.2 All components from the NCRS are dropped onto the miscellaneous parts removal station conveyor. After the operation in the NCRS is completed, the station signals to the PLC that it is ready to index. The Index Table is then rotated clockwise to bring the projectile/mortar to the MPRS.

14.4.2.9 Miscellaneous Parts Removal Station (MPRS)

14.4.2.9.1 The MPRS removes the fuze well cup or supplemental charges from the projectiles. Not all projectiles have components that require removal at the MPRS station. Munitions that do not require any disassembly at this station [such as some 155mm projectiles and all 4.2-inch (M2A1) mortars] will bypass it. When sensor P3 detects a projectile is present at the MPRS, the projectile hold-down cylinder and positioning cylinder extend. Then, the MPRS carriage moves forward to remove the components from the following types of projectiles:

Projectile	Removal Process
155mm	The screw type fuze well cups from M104 and M110 projectiles are removed.

14.4.2.9.2 Components that have been removed are deposited on the MPRS conveyor. The MPRS conveyor discharges all parts onto the DFS feed gate, from which they are sequenced into the DFS.

14.4.2.9.3 Reserved

14.4.2.9.4 When processing 155mm M104/M110 projectiles, following fuze well cup removal, the Burster Rotating Adapter Device (BRAD) extends to contact the burster. The BRAD then rotates the burster, in preparation for burster removal at the Burster Removal Station (BRS).

14.4.2.10 Burster Removal Station (BRS)

14.4.2.10.1 The BRS is the next station to process the projectiles after the MPRS. The BRS is used to remove bursters from projectiles with the use of high pressure air. The 4.2-inch mortars are not processed by the station. The operation begins when a projectile is

sensed by the P4 sensor. The projectile positioning cylinder extends. Then the BRS carriage moves forward and a delta-P head assembly contacts the projectile. High pressure air (approximately 100 - 300 pounds per square inch) is applied to the head of the projectile. The differential pressure causes the burster to separate from the projectile, and the BRS carriage retracts with the burster. A gripper transfers the burster to a conveyor which in turn transfers the burster to the BSR. The BSR shears the burster into sections and feeds them to the DFS.

14.4.2.10.2 Reserved

14.4.2.11 Discharge/Output Station (DS)

14.4.2.11.1 The projectile will be rotated to the DS after its burster is removed at the BRS. The 4.2-inch mortars bypass the MPRS and BRS enroute to the DS. The DS transfers the projectile/mortar to the projectile discharge conveyor. This is accomplished using the PMD transfer conveyor pusher. The projectile discharge conveyor transfers the projectile/mortar to the discharge blast gate. Sensor ZS-147 or ZS-247, for line A or line B, respectively, is interlocked with the discharge blast gate. The sensor allows the discharge blast gate to open and keeps it open until the projectile/mortar has successfully passed out of the ECR.

14.4.2.11.2 After the projectile/mortar exits the ECR a burster detection system, located at the Projectile Output Conveyor discharge stop in the Upper Munition Corridor, checks the projectile to verify that the burster has been removed. After verifying burster removal status, the mortar is tilted to the upright position. If a burster is detected in the projectile, the Multi-position Loader (MPL) will not transfer the projectile to the munitions tray. The projectile with the detected burster will be loaded onto the reject table by the MPL. The reject tables are located next to the Projectile Output Conveyor discharge stop. They can each hold a maximum of four projectiles or six 4.2 inch HT mortars. Any rejected projectiles will be removed manually by an operator in appropriate PPE. The projectiles are then loaded onto an empty munitions tray by the MPL. The loaded tray will be transported into the MPB, and the projectiles/mortars will be processed by the MDM.

14.4.2.12 System Shutdown (Normal)

14.4.2.12.1 Normal shutdown of the PMDs is done in accordance with standard operating procedures. The system must be first clear of all munitions. The CON operators then issue “stop” and “park” commands to the system. The equipment is placed in home position at this time.

14.4.2.13 Emergency Shutdown

14.4.2.13.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition may include any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.4.2.14 Extended Shutdown

14.4.2.14.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation, or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the PMD systems have been parked. The extended shutdown procedures are implemented during agent campaign changeover.

14.4.2.15 Maintenance

14.4.2.15.1 To ensure that the PMDs are in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the PMDs will be systematically subjected to preventive maintenance inspections.

14.4.3 Monitoring Procedures

14.4.3.1 Each PMD is equipped with several types of sensors to detect the presence and position of projectiles/mortars during operation. These sensors ensure that the projectiles/mortars will be processed safely by relaying information to the PLC. The functions of these sensors are described in Section 14.4.1.11, "Instrumentation", and summarized in Table 14-4-2.

14.4.3.2 The CON operators monitor the operations of the PMDs through the demilitarization operator consoles and CCTVs. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provides operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements.

14.4.3.3 In addition, the CON operators and outside operators are required to log the events that occur during their shift into their respective logbooks.

14.4.3.4 Chemical agent released in the ECRs will be contained by the sumps or controlled by the HVAC system. ACAMS are used to monitor for the presence of agent in the ECRs and the ECV.

14.4.3.5 Fire monitoring is described in Section 14.3.1.14, "Fire Protection".

14.4.3.6 Waste Identification

14.4.3.6.1 By the time a projectile/mortar reaches the PMD, it will have been fully identified per Attachment 2 (Waste Analysis Plan).

14.4.3.7 Waste Throughput

14.4.3.7.1 When a projectile/mortar arrives at the PMD, its nose closure or fuze is removed. Then the supplementary charge or miscellaneous parts (if any) are removed. The next station removes the burster by differential air pressure. The projectiles/mortars are quantified by the PDARS and by the manual record created by the CON operator who observes the PMD in operation.

14.4.4 Inspection

14.4.4.1 See Section 14.3.4.

14.4.5 Closure

14.4.5.1 Partial Closure

14.4.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the ECRs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; and maintenance and repair will be performed on the machines and other room components as necessary. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure from the Executive Secretary, the next campaign will commence when authorized and when it is appropriate to do so.

14.4.5.2 Final Closure

14.4.5.2.1 Closure of the site is addressed in Attachment 10 (Closure Plan).

14.4.6 Mitigative Design and Operating Standards

14.4.6.1 The ECR is a room where explosives or propellants could potentially be ignited. The design and operating plans for the ECR have been carefully prepared to anticipate this type of mishap. For example, as a worst-case situation, the operating plan limits the total amount of explosives or propellants that are present in the room at any one time so that in the event of an accidental ignition, the ECR could contain the reaction.

14.4.6.2 Protective systems in the ECR include an industrial-type, automatically activated fire sprinkler system. Also, water and decontamination solution outlets are available within the room for final manual wash-down and area cleanup. The floor of the room is sloped to drain to a sump, and the sump de-watering system transfers the collected liquid to the SDS for disposal in one of the two LICs. Protective clothing is mandatory during cleanup of explosive and propellant residues in the room, and care is taken to reduce the potential for residues.

14.4.6.3 If an explosion occurs in a containment room, it is expected that a portion of the agent will be combusted while the remainder will exist in a vapor or liquid form. In the ECR, the agent vapors will be contained in the room because both the blast valves and the leak-tight dampers will be closed. The blast valves will remain closed until the pressure decays to the point where the spring force is greater than the room pressure (0.5 pounds per square inch). At this pressure, the blast valve will open, but the leak-tight damper will continue to contain the gases. The leak-tight dampers will not be opened until the room gas pressure has decayed to approximately atmospheric pressure.

14.4.6.4 The ECR is completely surrounded by rooms that are ventilated to the filter system. Therefore, any leakage out of the ECR as a result of a blast will be vented to the filter system.

14.4.6.5 Liquid agent in the ECR resulting from an explosion or leaking munition will be collected in the ECR sump. Because of the limited number of munitions that will be in the ECR at any one time and the maximum agent capacity of individual muntions in the event of a leak, the amount of liquid agent released by an explosion is not expected to be greater than about two gallons. Once ventilation has been reestablished in the ECR (by reopening the gas-tight valves), DPE entries will be made, and the area will be hosed

down with decontamination solutions. Sufficient decontamination solution will be used to ensure complete neutralization of the agent. The resulting solution will then be pumped to the SDS for later disposal in the LICs.

14.4.6.6 If entry to the ECR is required after processing projectiles/mortars and explosives may be present, the Entry Team shall thoroughly wet each other's PPE and the ECR floor (where they will be working) immediately prior to entering the ECR, to preclude the possibility of static discharge. A water hose is available at the decontamination station by the access door to each ECR.

14.4.7 Environmental Performance Standards for Miscellaneous Units

14.4.7.1 The PMDs have been designed, installed, and will be operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.4.7.2 describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.4.7.2 Miscellaneous Unit Wastes

14.4.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the PMDs include 155mm projectiles and 4.2-inch mortars. These wastes have been fully identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan). The maximum volumes of wastes that will be allowed into the ECR at one time are listed in Table 14-4-1.

14.4.7.2.2 The energetics and chemical agent wastes will be incinerated. The nose closure or fuze and burster removed from the projectiles/mortars will be incinerated in the DFS. The chemical agent will be drained by the MDMs and then incinerated in the LICs. The projectile nose plugs and drained projectiles/mortars will be sent to the MPF.

14.4.7.3 Containment System

14.4.7.3.1 See Section 14.3.7.3.

14.4.7.4 Site Air Conditions

14.4.7.4.1 See Section 14.3.7.4.

14.4.7.5 Topography

14.4.7.5.1 See Section 14.3.7.5.

14.4.7.6 Meteorologic and Atmospheric Conditions

14.4.7.6.1 See Section 14.3.7.6.

14.4.7.7 Air Quality

14.4.7.7.1 See Section 14.3.7.7.

14.4.7.8 Prevention of Air Emissions

14.4.7.8.1 See Section 14.3.7.8.

14.4.7.9 Operating Standards

14.4.7.9.1 Based on the above, chemical agent is assumed to be the pollutant of concern from the PMDs with respect to air emissions.

14.4.7.9.2 Chemical agent emissions from the PMDs will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to the 120-foot HVAC stack.

14.4.7.9.3 The PMDs are located in the ECRs within the MDB. The ECRs are maintained at approximately -2 inches of water column. These two rooms are maintained at the lowest pressures within the MDB so that all air emissions from the PMDs during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.4.7.9.4 Attachment 5 (Inspection Plan) covers the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect chemical agent, and to determine loss of blower performance.

14.4.7.10 Site Hydrologic Conditions

14.4.7.10.1 A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.4.7.11 Migration of Waste Constituents

14.4.7.11.1 See Section 14.3.7.11.

14.5. MULTIPURPOSE DEMILITARIZATION AND PICK AND PLACE MACHINES

14.5.1 Physical Characteristics

14.5.1.1 The TOCDF MDMs are designed to either 1) remove burster wells and drain chemical agent from 4.2-inch mortar cartridges or 2) collapse mustard 155mm projectile burster wells down into the projectile body. The processed munitions and projectile nose plugs are sent to the MPF for thermal treatment. Chemical agent is collected by the ACS, a separate system that includes the AQS, agent holding tanks, associated pumps, valves, piping, and other ancillary equipment. The agent is then sent to one of the LICs for processing. Since no agent is drained from the mustard 155mm projectiles, only minor amounts of froth will enter the ACS.

14.5.1.2 There are three MDMs in the MPB. Associated with each MDM is a PPM. The PPMs are robotic systems designed to transfer one munition at a time from the munitions trays to the MDMs and then back to the munitions trays. The PPMs do not perform demilitarization operations but are an integral part of the MDM demilitarization process. Therefore, information about them is included in this Permit.

14.5.1.3 For purposes of defining the MDMs, they are considered to begin and end at the pick and place robot loader. The loader is the part of the PPM that removes munitions from the munitions tray. The demilitarization process begins when the munitions tray arrives at the appropriate location in the MPB, as determined by an electronic sensor, and the pick and place loader selects and removes a munition from the tray. The demilitarization process ends, with respect to the MDM, when the pick and place loader retrieves the munition from the MDM and returns it to the tray.

14.5.1.4 The MDMs process munitions that are not configured with explosives, propellants, or other energetics, so the processing system is only concerned with separating the chemical agent from the munition [the explosives, propellants, and energetics are removed in the ECR by the PMD]. The MDMs are similar to the PMDs in that the munitions are placed on an indexing tray that rotates the munitions from one processing station to the next. Each station is designed to perform a different operation. The munitions enter and leave the MDM from the same station (i.e., Load/Unload Station). The following munitions are processed on the MDMs:

14.5.1.4.1 Reserved
14.5.1.4.2 Reserved
14.5.1.4.3 M104, 155mm Projectiles (H)
14.5.1.4.4 M110, 155mm Projectiles (H)
14.5.1.4.5 Reserved
14.5.1.4.6 Reserved
14.5.1.4.7 M2, 4.2-inch Mortar Cartridges (HT)
14.5.1.4.8 M2, 4.2-inch Mortar Cartridges (HD).

14.5.1.5 Equipment Installation

14.5.1.5.1 The equipment that constitutes the MDMs and PPMs has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Condition I.S. This Certification attests that the MDM/PPM processing system equipment has been installed in accordance with the equipment's design specification and drawings, as stated in the Permit. Information about the Certification documentation is referenced herein to avoid duplication in this Permit.

14.5.1.6 Dimensions and Location

14.5.1.6.1 The PPMs straddle the MDMs as well as each conveyor line (Line A and Line B) in the MPB. The width of the PPMs is approximately 35 feet. The height to the centerline of the mast, which supports the pick and place robot loader carriage, is approximately 12 feet. The height to the top of the carriage is approximately 15 feet.

14.5.1.6.2 The MDMs and PPMs are located on the second floor of the MDB in the MPB.

14.5.1.7 Conveyors

14.5.1.7.1 Munitions are transported to the MDMs using Line A and Line B conveyor systems. Each line is composed of three conveyors. The conveyors automatically transport munitions trays to the correct location for pick and place operations. Various sensors located along the conveyor rails detect the presence of munitions trays, adjust the tray speed, and stop the trays as needed.

14.5.1.8 Gates

14.5.1.8.1 The munitions trays are transferred automatically from the Upper Munitions Corridor into the MPB through one of the two MPB gates. These gates are opened to receive munitions. The gates are not interlocked with the MDMs or PPMs, but they are interlocked with sensors that detect the presence of a munitions tray beneath the gate (see Section 14.5.2.6, "Interlock Processes").

14.5.1.9 Pump and Transfer Lines

14.5.1.9.1 The MDMs are equipped with pumps to remove agent from the munitions. The agent is transferred by a pump from the munitions through lines connecting the pumps to the ACS. The ACS storage tanks are located in the MDB.

14.5.1.10 Tanks and Containers

14.5.1.10.1 There are no tanks or containers directly associated with the MDMs for the processes addressed in this Permit. However, there is a tank on each MDM that is part of the AQS, which is part of the ACS. The tank associated with the MDMs is either a 1.5-inch or 3-inch diameter tank. The 3-inch diameter tanks are used during processing of 4.2 inch mortars. Agent is not drained from the mustard 155mm projectiles.

14.5.1.11 Feed System

14.5.1.11.1 The PPMs are the waste feed system for the MDMs. The PPMs are fully automated (or manually operated) robotic systems that move waste munitions to the MDMs for processing and then return them to the munitions trays. Agent removed from munitions at the MDM is collected by the AQS and sent to the LICs. In addition, the processed munitions are fed to the MPF for thermal treatment.

14.5.1.11.2 As will be discussed in later sections, the PPM is connected to the PDARS that records the number of munitions processed by the MDMs. The rate at which waste munitions are fed to the MDM depends on the type of munition (only one type of munition is processed at a time). The MDMs can hold up to six munitions of the same caliber and fill-type at a time. Processing time varies depending primarily on the time it takes to drain the various size munitions and load/unload them.

14.5.1.12 Instrumentation

14.5.1.12.1 Instruments associated with the MDMs are remotely monitored in the TOCDF CON. The instruments are primarily associated with the hydraulic and pneumatic systems, electronic position sensors, drain verification system, and interlocks. The sensors provide input to the programmable logic controllers (PLC) for automatic processing of various munitions. The PLCs, in turn, control the automatic function of the various MDM instruments.

14.5.1.12.2 Table 14-5-1 & Table 14-5-1a[4] summarizes the various sensors for the MDM and their functions. The instruments, and their tag numbers, are shown on drawings contained in Attachment 11 (General Facility Drawings).

[4] All tables are located at the end of this Attachment.

14.5.1.13 Electrical System

14.5.1.13.1 See Section 14.3.1.12.

14.5.1.14 Heating, Ventilation, and Air Conditioning System (HVAC)

14.5.1.14.1 See Section 14.3.1.13.

14.5.1.15 Fire Protection System

14.5.1.15.1 See Section 14.3.1.14.

14.5.1.16 Alarm and Communication Systems

14.5.1.16.1 See paragraph 14.3.1.15.

14.5.2 Operations and Maintenance

14.5.2.1 After the explosive components of the munitions have been removed in the ECR, trays of munitions are transported by the Charge Car, located in the Upper Munitions Corridor, to the MDMs in the MPB via the Line A or Line B MPB feed conveyors. The MDMs and PPMs are fully automated but can be operated manually (remotely or locally controlled), if required. A brief description of the MDMs and PPMs operation is contained in the following sections.

14.5.2.2 General System Operation

14.5.2.2.1 Each of the three MDMs can be operated separately, in conjunction with either of the other two MDMs, or simultaneously with both of the other two MDMs.

14.5.2.2.2 Prior to startup, the CON operators execute a series of computer commands to initiate the MDMs and PPMs. To begin MDM operations, the operators in the CON then issue a "start" command. The initiation and startup procedures, respectively, are described in the next sections.

14.5.2.2.3 The trays come into the MPB through the MPB gates after being processed in the ECR (see Section 14.4 for ECR demilitarization machine operations). The CON operators use the CCTVs to verify that a munitions tray has arrived at the correct conveyor location for pick and place operations and also to verify the number of munitions in each tray. The number of munitions is recorded in a logbook.

14.5.2.2.4 The PPM selects a munition and lifts it from the munitions tray. The munition is carried to MDM Station 1 (Load/Unload Station), which serves as the delivery point for munitions entering the MDM and as the pickup point for munitions exiting the MDM. Several electronic sensors are used to monitor the presence of munitions at each MDM station (see Section 14.5.2.6 for a description of these sensors). Each munition is placed in the station vertically with the base down and the nose up.

14.5.2.2.5 The first munition delivered to the MDM is rotated to Station 2, and another munition is retrieved by the PPM and delivered to the Load/Unload Station. Then both munitions are rotated so that the first munition goes to Station 3 and the second moves to Station 2.

Another munition is placed in the Load/Unload Station and the table is rotated again. Eventually, the MDM is operated so that all six stations have a munition (except when the munitions tray does not have enough remaining unprocessed munitions to deliver to the MDM). Stations 2 and 3 do not perform any operations.

14.5.2.2.6 At MDM-101, Station 4 is normally used as the Bore Station. It is designed to bore out welded or stuck burster wells. This station is not expected to be used very frequently because most of the munition burster wells were assembled with the press fit method. If a munition requires boring, a clamp cylinder extends and holds the munition in place while the boring head (consisting of an appropriately sized spade drill bit) bores vertically down through the top of the munition. The bore head is raised and lowered by a feed cylinder that contains the bore head drill and motor and is mounted on four vertically-mounted bolster rods. As an alternative, this position can also be configured as a Nose Closure Removal/Burster Detection Station, which may be used to process projectiles received at the TOCDF without bursters. At this station, the nose plugs will be removed and the absence of a burster will be confirmed. At Station 4 of MDM-102 and MDM-103, a Burster Well Punch Station is installed in place of the original bore station for the "punch" or collapsing of mustard 155mm projectile burster wells down into the projectile body. Station 4 of MDM-102 and MDM-103 is not used during mortar processing.

14.5.2.2.7 Station 5 is the Pull and Drain Station. It is designed to remove the burster well, thus providing access to the agent-filled cavity in the munition, and then to drain the agent from the munition. Upon entering Station 5, the munition is lifted slightly and held in place while the carriage assembly, which contains a collet assembly and pull cylinders, is lowered so that the collet assembly enters the munition. The collet expands to grip the burster well, and the pull cylinders extend to raise the collet assembly and the burster well from the munition. Station 5 is bypassed for mustard 155mm projectiles since the agent cavity is previously breached at Station 4, and no agent is removed from the projectiles.

14.5.2.2.8 After the burster well is removed from the munition, the munition is shifted horizontally into the Drain Station position. A drain tube, which consists of a straight, hollow, steel tube, is lowered into the munition, and the ACS removes the agent from the munition. Under normal operations, it is expected that some of the agent will not be removed by this process. After draining the munition, the drain tube is retracted, the munition returns to the Pull Station, and the burster well is placed back in the munition (or, for some munition types, it is dropped into the burster well chute). Station 5 contains a drip pan to collect residual agent that may drip from the burster well and agent drain tube. During mortar processing, the bursters are not reinserted but dropped onto the reject chute where they fall to a small conveyor which transports them to a container where they are accumulated until the container holds approximately the same number of burster wells as there are drained mortars on a MPF Feed tray. When full the container is lifted onto the tray of drained mortars and fed with it to the MPF. Alternatively, if the equipment used to transfer the burster to the feed container then onto the feed tray is unavailable, then up to 96 burster wells may be collected and fed separately to the MPF.

14.5.2.2.9 Station 6 is the Crimp Station. It is designed to remove the burster well from the munition and crimp it. Crimping the burster well deforms it so that it no longer seats completely in the munition when replaced. The resulting gap between the burster well and the agent cavity allows a more thorough thermal combustion of the agent heel in the MPF. The burster well is removed from the munition by the burster well gripper

assembly. The burster well crimp jaw closes around the burster and deforms it. A strip cylinder is used to remove the burster well from the gripper assembly, where it may become stuck during compression. Station 6 is bypassed for the mustard 155mm projectiles since the burster well is not removed. Station 6 is also bypassed during mortar processing because the mortar burster wells are discarded at Station 5.

14.5.2.2.10 The munition is rotated to Station 1 after it is drained and the crimped burster well is placed back into the munition (except for mortar processing during which where the burster wells are discarded at Station 5 or for mustard 155 mm projectiles which are not drained). A burster well detector sensor located at Station 1 checks for the presence of a burster well except during processing of the mustard projectiles. If a burster well is not detected, the PPM places the munition on the reject table. If a burster well is detected, the munition is removed by the PPM and placed back in the munitions tray. The PPM straddles both conveyor lines so that, if needed, the MDMs could be fed from either line. The MDMs are not currently designed to feed munitions from one munitions tray on Line A, for example, and place it in a different munitions tray on Line B. The system is only designed to pick and place munitions from the same munitions tray on the same conveyor line.

14.5.2.3 Setup Procedures

14.5.2.3.1 The MDMs are initialized before being placed in service. All major system components are remotely activated from the CON, and the PLCs verify the proper operation of the system. These systems include instrument air, plant air, hydraulics, ACS, and conveyors. The indicators in the CON are observed to verify the status of the MDMs and auxiliary systems. The MDM system initialization icon is selected and, after the flashing green icon turns steady green, the MDMs are ready to receive a start command from the CON.

14.5.2.4 System Startup

14.5.2.4.1 The startup of the MDMs consists of preparing the MPB conveyors, preparing the MDMs, and preparing the pick and place loader. The MDM/PPM startup procedures are described in the standard operating procedures document. In summary, the CON operators start the system by placing the equipment in automatic mode (which is done remotely from the CON) and issuing a start command to the Line A and Line B conveyors and MDMs/PPMs. An initialization command is issued before the machines are ready to receive munitions.

14.5.2.5 Feed

14.5.2.5.1 As discussed earlier, each munition is fed one at a time to the MDMs by the pick and place loader. The munitions arrive on a munitions tray with the head (top) of the munition pointing up toward the ceiling. The trays are referred to as “egg crates” because of the way the munitions are arranged in rows and columns on the tray. The munitions tray does not have to be completely filled for MDM operations.

14.5.2.5.2 The munitions tray is automatically adjusted by the conveyors into a pre-established position under the pick and place loader. The munitions tray is indexed forward (or backward) so that each row and column of munitions is accessible by the pick and place loader. This is done automatically, but the CON operators can also input a row/column designation so that the tray will be moved to a corresponding location on the conveyor.

The CON operators record each munition that is loaded, unloaded, or rejected. In addition, the PDARS maintains a similar count for each munitions tray.

14.5.2.6 Interlock Processes

14.5.2.6.1 Conveyor Systems

14.5.2.6.1.1 The MDM conveyors are interlocked with the MDMs. That is, when the MDMs are processing munitions, the corresponding MDM conveyors will not automatically move the munitions tray to the next (or previous) conveyor. In addition, the individual conveyors are interlocked so that if two munitions trays are on the same line, the conveyors cannot be activated so that two munitions trays are sent to the same conveyor section. Tables 14-5-1 and 14-5-2 indicate the sensors on the MDMs and the conveyors.

14.5.2.6.1.2 The MPB Feed Conveyors are interlocked with the MPB gates so that when a munitions tray is entering the MPB, the gates cannot close. The sensors that interlock the gates are photoreflective sensors ZS-374 (Line A) and ZS-474 (Line B).

14.5.2.6.2 Station 1: Load Station

14.5.2.6.2.1 The PPM delivers munitions one at a time to and from the Load/Unload Station. This station has two sensors. Sensor X-101C (where X is a value of 1, 2, or 3 and refers to the specific MDM) checks for the presence of a munition at the Station, and sensor X-101D checks for the presence of a burster well before the pick and place loader lowers for pickup to discharge a drained projectile body. The MDM and PPM are interlocked so the MDM does not operate independently from the pick and place loader during loading or unloading operations.

14.5.2.6.3 Station 2: Spare Station 1

14.5.2.6.3.1 This station is a spare and does not have any sensors or interlocks. No demilitarization operations are conducted at this station.

14.5.2.6.4 Station 3: Spare Station 2

14.5.2.6.4.1 This station is a spare and does not have any sensors or interlocks. No demilitarization operations are conducted at this station.

14.5.2.6.5 Station 4: Bore Station at MDM-101 (or Burster Well Punch Station at MDM-102 and MDM-103)

14.5.2.6.5.1 The MDM-101 Bore Station is normally bypassed unless the munitions lot is determined to have burster wells that are seal-welded. However, if the lot does include seal-welded burster wells, the Bore Station is enabled and is the first stop for the munition at the MDM. Station 4 of MDM-101 is available for use if required during the processing of mortars.

14.5.2.6.5.2 The Bore Station has several sensors. Sensors 402A/B sense if the projectile clamp is extended or retracted, and sensor 404C indicates whether the munition is clamped. These sensors interlock the MDM Indexing Table and bore head. The bore will not start until the munition is clamped. In addition, sensors 403A/B, which sense the position of the

bore head, also are interlocked with the MDM. The original Bore Stations at MDM-102 and MDM-103 have been removed and replaced with the Burster Well Punch Station.

14.5.2.6.5.3 As an alternative, this position can also be configured as a Nose Closure Removal/Burster Detection Station which may be used to process projectiles received at the TOCDF without bursters. At this station, the nose plugs will be removed and the absence of a burster will be confirmed. Sensors 404A/B confirm the absence of a burster and activate an alarm if a burster is detected.

14.5.2.6.5.4 At Station 4 of MDM-102 and MDM-103, a Burster Well Punch Station "punches" or collapses mustard 155mm projectile burster well downward into the projectile body. Sensor 504A2 confirms the punch cylinder is fully extended into the projectile body.

14.5.2.6.6 Station 5: Pull and Drain Station

14.5.2.6.6.1 The Pull and Drain Station is a two-step process. Step one is the removal of the burster well from the munition. Sensor X-504C on the Pull and Drain Station indicates whether the burster is removed from the munition.

14.5.2.6.6.2 Step two is the draining of agent. Sensors X-510A/B indicates whether the drain tube has been extended into the munition, and sensors X-506A/B indicate if the drip pan and burster well chute are in the correct place. Additional sensors indicate whether the various hydraulic cylinders are extended or retracted.

14.5.2.6.6.3 The Station 5 sensors are important because they interlock the MDM Index Table so that it does not rotate during operations. In fact, each Station must have completed its operation before the MDM Index Table will rotate the munitions to the next station.

14.5.2.6.6.4 Mustard 155mm projectiles bypass Station 5 entirely since the burster well is not removed and the agent is not drained.

14.5.2.6.6.5 . During mortar processing, the burster wells are not reinserted but dropped onto the reject chute where they fall to a small conveyor which transports them to a container where they are accumulated until the container holds approximately the same number of burster wells as there are drained mortars on a MPF Feed tray. When full the container is lifted onto the tray of drained mortars and fed with it to the MPF. Alternatively, if the equipment used to transfer the burster to the feed container then onto the feed tray is unavailable, then up to 96 burster wells may be collected and fed separately to the MPF.

14.5.2.6.7 Station 6: Crimp Station

14.5.2.6.7.1 The Crimp Station has two operations that depend on whether the burster well is removed and discarded at Station 5. A collet cylinder gripper (an expandable collet) enters the munition, and pressure sensor X-603C indicates the presence or absence of the burster well. An alarm will be sent to the CON if a burster well is present when it should have been discarded or if the burster well is absent when it should be present. If either condition exists, the munition is rejected and the pick and place loader will place the munition in the corresponding reject table, which can hold four 155 mm munitions or six 4.2 inch mortars. For each MDM, there is one reject table (see Section 14.5.3.4 for more on waste throughput).

14.5.2.6.7.2 The remaining sensors at Station 6 indicate the position status of the various hydraulic cylinders. Station 6 sensors are important because they interlock the MDM Index Table so that it does not rotate during operation. When operations are completed at Station 6 and all other stations on the MDM have finished, the munition in Station 6 is rotated to Station 1.

14.5.2.6.7.3 Mustard 155mm projectiles bypass Station 6 entirely since the burster well is not removed and reinserted. Mortars bypass Station 6 since the burster wells are discarded at Station 5.

14.5.2.6.8 Station 1: Unload Station

14.5.2.6.8.1 Sensor X-101D checks for the presence of a burster well before the pick and place loader lowers for pickup except for the mustard 155mm projectiles.

14.5.2.7 System Shutdown (Automatic, Normal)

14.5.2.7.1 Shutdown of the MDMs consists of stopping and “parking” the PPM loader, MDMs, and MPB conveyors. The pick and place loader is issued a command that places the carriage in its "home" position and lowers the loader (end effector) to its fail safe position. The MDMs are shut down only after the Index Tables are verified to be clear of munitions.

14.5.2.7.2 The MDM conveyors are shut down one line at a time (if both were being used for operations). Both lines must be clear of munitions trays before stopping the conveyor systems. The conveyors are issued a “stop” command, and the Line A and/or Line B icon turns to magenta to indicate that the MDM conveyors are no longer started. After these commands are completed, the MDM, PPM, and conveyors are “parked” and system components are in their home positions.

14.5.2.7.3 Mustard 155mm projectiles bypass Station 6 entirely since the burster well is not removed and reinserted.

14.5.2.8 Emergency Shutdown

14.5.2.8.1 In the event of an abnormal or upset condition associated with the MDMs, PPMs, or MDM conveyors, the processing operations are modified in order to mitigate the condition. Abnormal or upset conditions are any conditions that cause an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. These conditions are identified by plant personnel or indicated by the process sensors (which send signals to the CON through the PLCs). After conditions are identified, the CON issues an emergency stop command to the MDM. When this command is issued, the MDM components are stopped.

14.5.2.9 Extended Shutdown

14.5.2.9.1 Extended shutdown procedures are in addition to normal shutdown procedures. Extended shutdown involves installing a spectacle blind in the agent line going to the Toxic Cubicle. This prevents backflushing and leakage of agent from the agent holding tanks.

14.5.2.10 Maintenance

14.5.2.10.1 Maintenance of the MDMs and PPMs includes preventive maintenance procedures and corrective maintenance procedures. Preventive maintenance procedures generally involve inspections, cleaning (as required), and lubricating (as required) of the MDMs and PPMs.

14.5.3 Monitoring Procedures

14.5.3.1 Each MDM is equipped with sensors to detect the presence, position, and configuration of each munition during operations. The sensors, which are connected through PLCs, ensure that the munitions are processed safely by relaying information to the CON. The locations and functions of these sensors are described in Tables 14-5-1 and 14-5-2.

14.5.3.2 The CON monitors the operations of the MDMs and PPMs through the demilitarization operator consoles and CCTV. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS acquires operational data for analysis and historical record keeping. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into their respective logbooks.

14.5.3.3 The MPB is a Category A room, and it is expected that this area will be contaminated by agent (liquid or vapor) as part of normal operations. ACAMSs are used to detect the presence of agent vapors in the MPB.

14.5.3.4 Waste Identification

14.5.3.4.1 As mentioned previously, waste munitions are identified prior to entering the MDMs. The quantity of munitions processed by the MDMs is recorded by the PDARS and confirmed visually by CON operators.

14.5.3.4 Waste Throughput

14.5.3.4.1 The waste entering the MDMs is an agent-filled munition. During treatment by the MDMs, the agent is separated from the munition and handled through the ACS. The metal casing is then returned to the munitions tray for thermal treatment in the MPF. In each case, quantification of waste occurs; the metal casing is quantified through the PDARS record and by the manual record created by the CON operator who observes the MDM operations.

14.5.3.4.2 As mentioned previously, some munitions may be rejected by the MDMs. The MDM sensors are designed to detect “reject” munitions and notify the CON operators. These munitions are sent to the associated reject table which stands next to the MDM Index Table. These munitions are retrieved manually by plant personnel dressed in appropriate PPE. In every case, the quantity of munitions are recorded by the PDARS and the CON operators maintain a record in their logbooks.

14.5.4 Inspection

14.5.4.1 See Section 14.3.4.

14.5.5 Closure

14.5.5.1 Partial Closure

14.5.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the MDMs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; all clouded observation windows that compromise the ability to view operations shall be cleaned or replaced; and maintenance and repair will be performed, as necessary, on the machines and other room components. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure by the Executive Secretary, the next campaign will commence, when authorized, and when it is appropriate to do so.

14.5.5.2 Final Closure

14.5.5.2.1 Final closure is addressed in Attachment 10 (Closure Plan).

14.5.6 Mitigative Design and Operating Standards

14.5.6.1 The MDMs are designed for demilitarization purposes and do not contain inherent components to mitigate the potential for waste migration to the environment. However, the MPB was designed for this purpose. The MPB will be operated in a manner to reduce the risk of waste constituent migration to the environment, as explained below.

14.5.6.2 The floor of the MPB is impervious and sloped to drain any spills to sumps located in the floor. Protective clothing is mandatory during cleanup of spilled agent in the room, and care is taken to reduce the potential for spills.

14.5.6.3 The MPB will not contain explosively configured munitions. Therefore, the room is not designed for, nor expected to incur, an explosion during munitions demilitarization. However, if an accident occurs, air from the MPB would be captured by the MDB ventilation filter system and would not escape to the atmosphere.

14.5.7 Environmental Performance Standards for Miscellaneous Units

14.5.7.1 The MDMs have been designed, installed, and are operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. The following sections describe the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.5.7.2 Miscellaneous Unit Wastes

14.5.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the MDMs are associated with projectiles and mortar cartridges. These wastes have been fully identified, and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.5.7.2.2 The maximum volume of agent being processed at the MDMs is equivalent to the number of munitions at each MDM station where agent has not been removed. This is equivalent to five munitions at each MDM time's three machines for a total of 15 munitions. This assumes each MDM is being utilized. The largest quantity of agent is associated with the M104 or M110 155mm projectiles (agent H), which were filled with 11.7 pounds of

mustard. Thus, the total quantity of agent being processed on all three MDMs is 175.5 pounds. The MDMs do not generate additional hazardous waste except for waste decontamination solution.

14.5.7.3 Containment System

14.5.7.3.1 See Section 14.3.7.3.

14.5.7.3.2 As mentioned previously, the maximum number of munitions (containing agent) in the MPB at any time during MDM operations is associated with five munitions trays. However, under normal operations, less than five trays may be present in the MPB. This is because only three trays can be actively used for pick and place operations while any other tray would be idle on one of the BDS indexing conveyors. For analysis purposes, it will be assumed that five munitions trays will be present and that each tray is completely filled with agent-filled munitions. This is equivalent to one of the following:

14.5.7.3.2.1 240 155mm projectiles (48 per tray)
14.5.7.3.2.2 480 mortar-cartridges (96 per tray).

14.5.7.3.3 Assuming, for example, each munition is completely filled, the maximum inventory of agent in the MPB during MDM operations is 264 gallons (this corresponds to 240 munitions times a maximum of 11.7 pounds of H per munition). In the event all the agent spills onto the floor of the MPB, the sumps will be able to hold all the spilled liquid.

14.5.7.3.4 In addition to the sumps, the MPB contains curbed walls so that liquid spills and decontamination solution will not leak under doors and gates. The floors and walls are painted with epoxy chemical-agent resistant paints to aid in decontamination.

14.5.7.4 Site Air Conditions

14.5.7.4.1 See Section 14.3.7.4.

14.5.7.5 Topography

14.5.7.5.1 See paragraph14.3.7.5.

14.5.7.6 Meteorologic and Atmospheric Conditions

14.5.7.6.1 See paragraph 14.3.7.6.

14.5.7.7 Air Quality

14.5.7.7.1 See Section 14.3.7.7.

14.5.7.8 Prevention of Air Emissions

14.5.7.8.1 See Section 14.3.7.8.

14.5.7.9 Operating Standards

14.5.7.9.1 The MPB is a Category A area and is under engineering controls at all times, as previously discussed. Liquid wastes are captured and controlled in the containment system, air emissions are controlled by the HVAC system and cleaned through filters, and the MDM operations are continuously monitored by the CON and PDARS. As a result, there is virtually no opportunity for the waste constituents to be released in such a way as to have adverse effects on human health or the environment due to migration into the outdoor environment. The liquids are placed in tanks or, if spilled, are contained in sumps and from there placed in tanks. Volatilized agent is captured by the HVAC system, primarily in carbon beds. The MDMs themselves are operated in a systematic and safe manner whether in automatic or manual mode, thereby reducing the potential for agent to be released and migrate into the air.

14.5.7.10 Site Hydrologic Conditions

14.5.7.10.1 A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.5.7.11 Migration of Waste Constituents

14.5.7.11.1 See Section 14.3.7.11.

14.6 Reserved

14.7 AIR OPERATED REMOTE ORDNANCE ACCESS SYSTEM (CUTTER MACHINE)

14.7.1 Physical Characteristics

14.7.1.1. The cutter machine is designed to remotely cut into cylindrical items. It may be used for nose closure removal, fuze removal, venting, and access to material or interior components. The machine is primarily made of aluminum and is a commercially available radial pipe cutting machine that has been modified for use in toxic areas. The major components of the system are a stabilizing base, split frame Wachs® cutter, cutter base and stabilizing legs, air motor and speed controller, vent hose, air lubrication mister, mister tube and stand, pyrometer and stand, and an air isolation valve. The split frame major components are: a tool slide, cutter blade, trip assembly, and star wheel. The split frame portion of the cutter is a pre-fabricated stand which has four bolts on the cutter frame. These bolts determine the level of the cut on the item by adjusting the height of the item and positioning it for the cutter.

14.7.1.2. Equipment Installation

14.7.1.2.1. The equipment that constitutes the cutter machine is not a permanently installed item. The cutter machine is intended to be used for the duration of the specialized campaign and then managed in accordance with paragraph 14.7.4, Closure. A cutter machine may be set up in the ECR for explosive or non-explosive configured items or in the MPB for non-explosive configured items only. In the event of an equipment failure beyond repair, a new cutter machine will be set up as a replacement-in-kind.

14.7.1.3 Dimensions and Location

14.7.1.3.1. The approximate size of the cutter machine is 14 inches in diameter, and 24 inches in height. Machine components are aluminum and steel. Some of the machine components

are nickel plated. Dead weight of the cutter machine and split frame cutter is estimated at 60 lbs.

14.7.1.4. Conveyors

14.7.1.4.1. The are no conveyors associated with the Cutter Machine. Items to be processed by the cutter machine are manually placed upon the pre-fabricated stand to position the item.

14.7.1.5 Gates

14.7.1.5.1. Items that are configured with energetics or non-energetics may be transferred either automatically or by remote manual control from the ECV into the ECRs through one of two ECR blast gates. These gates open to receive an item and will not close until the item is transferred completely into the ECR. For non-energetic items to be processed in the MPB, trays are transferred automatically from the Munitions Corridor into the MPB through one of two MPB gates. The gates are opened to receive items and they will not close until the items are transferred completely into the MPB.

14.7.1.6. Pumps and Transfer Lines

14.7.1.6.1. There are no pumps or transfer lines directly associated with the cutter machine.

14.7.1.7. Sump Pump

14.7.1.7.1. Both the ECRs and the MPB are equipped with containment sumps. Sump pump operation is controlled by a local-off-remote switch. When a sump level alarm is sent to the CON, the liquids collected in the sump are pumped to a spent decontamination holding tank.

14.7.1.8. Tanks and Containers

14.7.1.8.1. There are no tanks or containers directly associated with the cutter machine. Agent from the items processed by the cutter machine is either pumped to the ACS or SDS (after initial decontamination at the point of removal) or may be placed in the sumps for further processing.

14.7.1.9. Feed System

14.7.1.9.1. Items to be processed using the cutter machine will be manually placed on the cutter by personnel clad in the appropriate level of PPE based upon the hazards of the operation. All items will be manually processed in accordance with site approved operating procedures.

14.7.1.10. Instrumentation

14.7.1.10.1. There is no permanent PLC interface with the controls and instruments for the cutter machine. Any PLC interfaces that are added will be installed via the Temporary Change Process with all site required signatures and appropriate site reviews. The cutter machine operation is controlled remotely from the CON with careful monitoring via closed-circuit television.

14.7.1.11. Electrical System

14.7.1.11.1. See Section 14.3.1.12.

14.7.1.12. Heating, Ventilation, and Air Conditioning System (HVAC)

14.7.1.12.1 See Section 14.3.1.13.

14.7.1.13. Fire Protection System

14.7.1.13.1. See Section 14.3.1.14.

14.7.1.14. Alarm and Communications Systems

14.7.1.14.1. See Section 14.3.1.15.

14.7.2. Operations and Maintenance

14.7.2.1. The cutter machine will be utilized inside the Explosives Containment Rooms or in the Munitions Processing Bay to gain access to munitions or cylindrical items that require special handling. It may be used for nose closure removal, fuze removal, venting, and/or access to interior components. The cutter machine will be used in accordance with site approved operating procedures.

14.7.2.2. General System Operation

14.7.2.2.1. The cutter machine will be located in either ECR A, ECR B, or in the Munitions Processing Bay. The cutter is comprised of two components, the cutter and the split frame which correctly positions the item for the cutter. The cutter machine is a commercially available radial type pipe cutter designed to cut cylindrical items. The cutter is comprised primarily of aluminum components. It has been modified with an air isolation valve and mister tube. After the munition or cylindrical item is placed on the stabilizing base and appropriately prepared for cutting operations, the Control Room remotely activates supplied air to the cutter. The spray mister will begin to function and the cutting speed may be adjusted by the entrants. The mister nozzle tip will spray on the cut path in order to ensure that cutting temperatures remain near ambient. The cut is lubricated by an air mist of water based lubricant. The control room then monitors the cutter operation through the use of CCTV and process indicators in the Control Room. In the case of explosive configured items, while the cutting operations are in progress, entrants will exit the ECR.

14.7.2.3. System Startup

14.7.2.3.1. The procedure for the cutter machine start-up is contained in the appropriate Unusual Munition Handling SOP and related documents. In summary, the machine will be set-up by site personnel who will verify that the equipment is configured properly prior to use.

14.7.2.4. Feed

14.7.2.4.1. The munitions or cylindrical items will be placed upon the cutter machine one at a time for handling. Careful coordination of the operation will occur between the entrants and the Control Room personnel in accordance with site approved standard operating procedures.

14.7.2.5. Interlocks

14.7.2.5.1. Emergency shutoff of the cutter machine is via an air isolation valve. All emergency shutoff valves will be referenced in the appropriate SOPs of the operation.

14.7.2.6. System Shutdown (Normal)

14.7.2.6.1. The cutter machine operation is controlled remotely from the CON. To stop the cutter machine, the air solenoid is closed from the Control Room.

14.7.2.7. Emergency Shutdown

14.7.2.7.1. The Emergency Shutdown process is controlled remotely from the CON. The air solenoid will be shutdown from the CON, causing the cutter machine to stop. All activities are closely monitored by the CON via the CCTV.

14.7.2.8. Maintenance

14.7.2.8.1. The cutter machine is set up for a short-duration use to handle unusually configured munitions or cylindrical items. Since the duration of its operation is very short, no maintenance plan is required.

14.7.2.9. Monitoring Procedures

14.7.2.9.1. The CON operators monitor the operations of the cutter machine through the use of the CCTVs. In addition, CON operators are required to log the events that occur during their shift into logbooks and the appropriate munitions waste tracking forms.

14.7.2.10. Waste Identification

14.7.2.10.1 By the time a munition or cylindrical item reaches the cutter machine, it will have been fully identified in accordance with Attachment 2 (Waste Analysis Plan).

14.7.2.11. Waste Throughput

14.7.2.11.1 The cutter machine is, by design, used to gain access to the interior portions of a munition or a cylindrical item, to facilitate the appropriate treatment of the waste by allowing munitions or other items to be managed through the other approved treatment processed for agent, overpack material, or metal munition bodies or cylinders. Munitions are manually placed in the cutter by site personnel dressed in the appropriate level of PPE. Any liquid agent that is present during the cutting process is decontaminated with decontamination solution. The spent decontamination solution is collected in the sump and pumped to the SDS tank for eventual thermal treatment in the LIC. Any liquid collected in the sumps is emptied at least daily.

14.7.3. Inspection

14.7.3.1. The cutter machine will be inspected prior to first use after it has been assembled. Since the duration of the cutter machine operation is expected to be short, no permanent inspection plan is in place. The cutter machine is intended to be set-up, used for a short duration that is campaign specific, and dismantled when no longer needed.

14.7.4. Closure

14.7.4.1. Partial Closure

14.7.4.1.1. At the conclusion of the agent campaign, the cutter machine will be thoroughly decontaminated. The equipment may be re-used or scrapped and managed as waste. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the cutter.

14.7.4.2. Final Closure

14.7.4.2.1. Final closure of this site is addressed in Attachment 10 (Closure Plan).

14.7.5. Mitigative Design and Operating Standards

14.7.5.1. For the Mitigative Design and Operating Standards for the ECRs, refer to paragraphs 14.4.6.1. through 14.4.6.6. For the Mitigative Design and Operating Standards in the MPB, refer to paragraphs 14.3.6.2. and 14.3.6.3.

14.7.5.2. The cutter machine will be operated in a manner to preclude the release of hazardous chemical constituents that may have an adverse effect on human health and the environment. The following section describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impacts of such releases, and the location features of the TOCDF that will mitigate these releases.

14.7.5.3. Environmental Performance Standards for Miscellaneous Units

14.7.5.3.1. The cutter machine can be installed in either of the ECRs, or in the Munitions Processing Bay for non-explosive configured items. The ECRs and the Munitions Processing Bay have been designed, installed, and operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health and the environment. Section 14.2.7.2 describes the potential for waste constituent's releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.7.5.4. Miscellaneous Unit Wastes

14.7.5.4.1. The volume and the physical and chemical characteristics of the wastes to be treated at the cutter machine include munitions or other cylindrical items. These wastes will be fully identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan) or characterized in accordance with Attachment 2 (Waste Analysis Plan). The maximum volume of these wastes that can be processed in the cutter machine at one time is equivalent to the number of munitions that can be processed by the cutter, which is one. All metal components will be incinerated in the DFS or MPF. Energetic components may be fed to the DFS unsheared in accordance with site approved operating procedures. All drained chemical agent will be pumped to the ACS or the SDS (after initial decontamination at the point of removal) for incineration in the LICs.

14.7.5.5 Containment System

14.7.5.5.1. See Section 14.3.7.3.

14.7.5.6. Site Air Conditions

14.7.5.6.1. See Section 14.3.7.4.

14.7.5.7. Topography

14.7.5.7.1. See Section 14.3.7.5.

14.7.5.8. Meteorological and Atmospheric Conditions

14.7.5.8.1. See Section 14.3.7.6.

14.7.5.9. Air Quality

14.7.5.9.1. See Section 14.3.7.7.

14.7.5.10. Prevention of Air Emissions

14.7.5.10.1. The cutter machine itself is not a source of air emission in and of itself, but it is associated with treatment operations that could potentially emit air pollutants. See Section 14.3.7.8.1. through 14.3.7.8.5.

14.7.5.11. Operating Standards

14.7.5.11.1. The cutter machine is a commercially available radial pipe cutter. It will be operated in accordance with manufacturer's guidelines and site approved operating procedures.

14.7.5.12. Site Hydrologic Conditions

14.7.5.12.1. A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.7.5.13. Migration of Waste Constituents

14.7.5.31.1. Migration of wastes into the environment from the cutter machine is not expected to occur. The cutter machine will be operated in the MDB, which is designed to prevent the migration of waste to the environment. Therefore, no impacts on human health and the environment from the cutter machine are expected.

14.8 Drum Ventilation System (DVS)

14.8.1 Physical Characteristics

14.8.1.1. The major components of the DVS are the two enclosures, the sorting room (DVSSR) and the Igloo Carbon Adsorption Filtration System.

14.8.1.1.1 Each DVS Enclosure is designed to completely enclose a maximum of six (6) 55-gallon drums of secondary waste for the purpose of ~~opening up the drums to gain access to their contents,~~ monitoring the headspace for agent contamination~~., sort and characterize the contents, and treat agent-contaminated contents by decontamination to levels applicable to the PPE available in Area 10.~~ The enclosures are closed-vented to an induced-air

carbon adsorption filtration system designed for effective removal of particulates and chemical agents. The enclosures are made primarily of carbon steel and each possesses a total of six observation windows and glove-port pairs to enable manipulation of the drums while they are enclosed. An additional glove-port pair is provided near the enclosure sump low-point. Each enclosure is equipped with non-powered conveyor rollers and a shuttle tray that enables the drums to be rolled into and out of it. The bottom plenum of each enclosure is designed to provide secondary containment of liquid.

14.8.1.1.2 The DVSSR is designed to completely enclose two (2) personnel and four (4) 55-gallon drums of secondary waste for the purpose of opening up the drums to gain access to their contents, monitor the headspace for agent contamination, sort and characterize the contents, and treat agent-contaminated contents by decontamination. The DVSSR is closed-vented to the shared (with the DVS enclosures) induced-air carbon adsorption filtration system, which is designed for effective removal of particulates and chemical agents. The DVSSR is made primarily of carbon steel and possesses two serial intermediate personnel airlocks. All three compartments (i.e., the two airlocks and the working compartment sorting room) are equipped with compressed air, water and decontaminant drops. Each compartment possesses an observation window and an elevated floor sloped to a sump. In addition to personnel doors, the working compartment sorting room is equipped with non-powered conveyor rollers and a sliding access door that enables the drums to be rolled into and out of it. The sorting room possesses an overhead trolley that simplifies the movement of waste drums.

14.8.1.1.3 The Igloo Carbon Adsorption Filtration System is designed to effectively remove and capture agent from airspace within the Igloo and each DVS and DVSSR by 1) maintaining a constant negative pressure within each DVS enclosure and DVSSR and the direct vent duct leading to the induced-draft fan, 2) directing each DVS enclosure and DVSSR headspace gas through an activated carbon adsorption bed, 3) providing activated carbon capacity in excess of the combined total volume of agent present in the Igloos, and 4) discharging the filtered air to the atmosphere. The activated carbon bed is monitored continuously for breakthrough per Attachment 22 (Agent Monitoring Plan).

14.8.1.2. Equipment Installation

14.8.1.2.1. Prior to hazardous waste operations at each DVS and DVSSR, its design and installation will have been verified through the Facility Construction Certification (FCC) documentation required by Condition I.S. This Certification attests that each DVS and DVSSR equipment has been constructed and installed in compliance with this Permit per Condition I.S.1.

14.8.1.3 Dimensions and Location

14.8.1.3.1. Both DVS enclosures are permanently mounted to the floor of DCD Area 10 Igloo 1632. The size of each enclosure is approximately 8’-7” tall, 9’-2” long, and 5’-8” wide. The non-powered feed conveyor and pass-through air lock extend the overall length of the entire unit to approximately 19’-0”.

14.8.1.3.2 The DVSSR is a fabricated enclosure with three separate compartments (i.e., two serial intermediate personnel airlocks and the main working compartment.) The DVSSR resides at the east end of Igloo 1632. The overall size of the DVSSR is approximately 19’ long and 14’ wide. The non-powered feed conveyor extends an additional four feet.

14.8.1.4. Conveyors

14.8.1.4.1. There are no powered conveyors associated with the DVS and DVSSR. Secondary waste drums to be process within the DVS and DVSSR are placed upon a shuttle tray that rests on feed conveyor rollers spaced approximately 12". Once the main sliding access door is opened, the shuttle tray and drums are rolled directly into the unit.

14.8.1.5 Gates

14.8.1.5.1. Each DVS enclosure has an access door/gate on each end. On one end is a pass-through airlock for passage of various tools and materials. The pass-through airlock has door pairs (e.g., two inboard and two outboard) that measure approximately 20" x 20" square. On the opposite end is the full-width sliding main feed door that enables the feed and removal of the secondary waste drums. The main door is approximately 5' wide and 4' high. All doors are manually-operated. The latches of the main feed door are electronically supervised to provide assurance of door closure.

14.8.1.5.2 In addition to the personnel doors, the DVSSR has a sliding door/gate that provides access directly into the working compartment (e.g., the sorting room). The sliding door is approximately 5' wide and 4' high. All doors and gates are manually-operated. The latches of the sliding door/gate are electronically supervised to provide assurance of door closure.

14.8.1.6. Pumps and Transfer Lines

14.8.1.6.1. The only pump/transfer lines associated with the DVS catch basin are the enclosure and DVSSR sump pumps and transfer lines leading to the nearby accumulation tank.

14.8.1.7. Sump Pump

14.8.1.7.1. The DVS catch basin and DVSSR sumps serve to collect liquid inside the compartments. Each enclosure sump and DVSSR sump has been equipped with a transfer pump for conveying liquid to a nearby tank for accumulation. The sumps will be emptied within 24 hours in order to ensure the secondary containment capacity of the sumps remains available.

14.8.1.8. Tanks and Containers

14.8.1.8.1. Spent decontamination solution is manually transferred to a nearby <90-day accumulation tank.

14.8.1.9. Feed System

14.8.1.9.1. Secondary waste drums to be opened, stored, or treated in the DVS Enclosures and DVSSR are placed upon the shuttle tray and manually rolled into the unit through the open main feed door. Secondary waste is removed from the enclosure through the same main feed door. Waste drums are moved into the DVSSR through the main door.

14.8.1.10. Instrumentation

14.8.1.10.1. With the exception of agent monitoring, all instrumentation is local only to the Igloo 1632 and the adjacent filtration system facility.

14.8.1.11. Electrical System

14.8.1.11.1. The only electrical system pertaining Igloo 1632 (DVS/DVSSR) is associated with instrumentation, monitoring, and lighting.

14.8.1.12. Heating, Ventilation, and Air Conditioning System (HVAC)

14.8.1.12.1 The DVS enclosures and DVSSR reside within DCD Area 10 Igloo 1632. General-area heating, ventilation and air conditioning of Igloo 1632 are provided separate of the Igloo Carbon Adsorption Filtration system.

14.8.1.13. Fire Protection System

14.8.1.13.1. Type ABC hand-held fire extinguishers are staged in Igloo 1632. See Attachment 9 (Contingency Plan.)

14.8.1.14. Alarm and Communications Systems

14.8.1.14.1. Igloo 1632 and the adjacent support building are equipped with a communication system that is similar to that of the TOCDF site to include local area network phone service and Public Announcement (PA) system, hand-held radios and cell phones. These systems are available to alert employees of emergencies or to summon assistance.

14.8.2.1. Maintenance

14.8.2.1.1. The DVS enclosures and DVSSR possess moving parts such as door latches, door seals, conveyor rollers, gloves, sump pumps, pressure gauges, etc. These moving parts will be maintained via Maintenance Work Order as necessary when identified by visual inspection. The Carbon Adsorption Filtration System first and second carbon beds are monitored continuously for breakthrough and/or leakage that would indicate end-of-life or failure of the carbon beds. Carbon must be changed within 15 days of break though. Upon replacement of carbon, a post-installation leak test of the bed seals verifies proper installation. Induced-draft fan operations will be maintained as part of a preventive maintenance schedule. Induced-draft fan degradation or failure is detected by adverse flow rates and enclosure negative pressure, as monitored during the operation.

14.8.2.2. Monitoring Procedures

14.8.2.2.1. The DVS instrumentation have a local alarm if enclosure of the units are not operated under negative pressure. Agent monitoring will be accomplished locally using ACAMS. The ACAMS can also be monitored via the Control Point located adjacent to, and west of, the Igloos.

14.8.2.3. Waste Identification

14.8.2.3.1 The DVSSR will be used to sort and treat secondary waste. Secondary waste will be received at the Igloo 1632 from storage with predetermined waste stream identification. No new previously-unspecified waste streams will result from operation of the DVS. Liquid residue resulting from the decontamination of the waste in the enclosure is managed as newly-generated hazardous waste.

14.8.2.3.2 The application of decontamination solution in order to enable offsite shipment of the TOCDF-originated sample waste only as described in the WAP (e.g., ensure agent concentration of the residual spent decon is below 20 ppb GB/VX or 200ppb Mustard) (i.e., waste streams CAL Aqueous Wastes, CAL Solid Wastes and MSB Solid Waste).

14.8.2.3.3 Waste streams that are allowed to be reclassified by headspace monitoring for agent contamination (i.e., P999 to F999 or P999/F999) are specified Condition VIII.E.16.d.

14.8.3. Inspection

14.8.3.1. The DVS enclosures,,DVSSR and its Carbon Adsorption Filtration System will be inspected as specified in Attachment 5.

14.8.4. Closure

14.8.4.1. Partial Closure

14.8.4.1.1. Partial closure does not apply to the DVS and DVSSR. Following the final closure of the DVS and DVSSR, TOCDF will submit in writing to the Executive Secretary, a request for partial closure of Igloo 1632. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of Igloo 1632. After approval of partial closure, Igloo 1632 will be turned back over to DCD Area 10 for final closure.

14.8.4.2. Final Closure

14.8.4.2.1. Final closure of the DVS and DVSSR will be performed in compliance with R315-8-7 and this permit. Final closure of Igloo 1632 will be accomplished via the DCD Area 10 Closure Plan.

14.8.5 Mitigative Design and Operating Standards

14.8.5.1 Containment System

14.8.5.1.1. The DVS enclosures have been designed with secondary containment capacity to store in excess of six (6) 55-gallon drums of liquid waste. The floor and sump of the DVSSR working compartment (sorting room) has been designed with secondary containment capacity to store in excess of four (4) 110-gallon drums. This enables the storage of any combination of liquid-bearing and non-liquid bearing containers in the enclosures and DVSSR.

14.8.5.2. Site Air Conditions

14.8.5.2.1. The following paragraphs describe the potential impacts of air emissions due to operation of the DVS Enclosures, DVSSR and Igloo Carbon Adsorption Filtration System. A brief description of topographic and meteorological characteristics of the Tooele area are presented as well as a summary of potential impacts on existing air quality in the Tooele region

14.8.5.3. Topography

14.8.5.3.1. See Section 14.3.7.5.

14.8.5.4. Meteorological and Atmospheric Conditions

14.8.5.4.1. See Section 14.3.7.6.

14.8.5.5. Air Quality

14.8.5.5.1. See Section 14.3.7.7.

14.8.5.5.2 Any air emissions from the DVS Enclosures and DVSSR are captured and processed through the Igloo Carbon Adsorption Filtration system before being exhausted to the atmosphere.

14.8.5.6. Prevention of Air Emissions

14.8.5.6.1. The DVS Enclosures and DVSSR are served by a Level 3 40 CFR 264 Subpart CC air pollutant emissions control device. All emissions are routed through the carbon adsorption beds via an induced-draft fan. The carbon beds effectively remove air pollutant compounds and are monitored continuously for agent break-through.

14.8.5.7. Operating Standards

14.8.5.7.1. The DVS Enclosures, DVSSR and the Carbon Adsorption Filtration System will be operated in accordance with engineer's and manufacturer's specifications. Negative pressure, door closure and operation of the filtration system will be verified during treatment operations in the enclosures and DVSSR.

14.8.5.8. Site Hydrologic Conditions

14.8.5.8.1. A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.9 AUTOCLAVE

14.9.1 Physical Characteristics

14.9.1.1. The Autoclave is designed to destroy the chemical agent contamination occurring on Secondary Waste articles through hydrolysis of the chemical agents. The Autoclave is of direct steam design (i.e., the steam contacts the articles), and is a horizontal cylinder 20 feet in length and six feet in diameter. The sealing door is equipped with an O-ring. The entire Autoclave installation includes the Autoclave, a 5.2 million BTU/hr boiler, a boiler water conditioning system, a steam operated eductor used to evacuate the Autoclave, a chilled water condenser and a refrigerant based condenser used to condense and dry the air and water mixtures evacuated from the Autoclave prior to the dried and cooled gases being directed to the forced-air carbon adsorption filtration system. The installation also includes valves, process instrumentation, waste bins in which waste~~s~~ drums are placed for Autoclave treatment, and a Programmable Logic Controller (PLC). Note disposable thermocouples are used to monitor the temperature of the wastes being treated. Two 1,000-gallon condensate storage tanks and a 175-gallon transfer tank with associated pump and transfer lines are also included in the installation. The condensate tanks will be operated as less than 90-day accumulation tanks.

14.9.1.2. Equipment Installation

14.9.1.2.1. Prior to initiation of hazardous waste operation activities in the Autoclave, its HVAC filtration system and the condensate tanks, their design and installation has been constructed in compliance with I.S.1. This Certification attests that the Autoclave equipment has been constructed and installed in accordance with the equipment's design specification and drawings.

14.9.1.3 Dimensions and Location

14.9.1.3.1. The Autoclave is a horizontally placed steel cylinder measuring 20 feet long and six feet in diameter. Installation is in Igloo 1631 of Area 10.

14.9.1.4. Conveyors

14.9.1.4.1. There is an internal chain conveyor that is used to move waste bins in and out of the Autoclave. The content of Secondary Waste drums to be processed in the Autoclave is transferred to 64.7 cubic foot waste bins. Drums containing specific Secondary Wastes are ~~also~~ placed directly into the waste bins for treatment as allowed by permit conditions found in Module VIII. A liner is placed into each waste bin before it is loaded with ~~Secondary Waste~~drums. The Autoclave will hold up to four of these waste bins. The waste bins are then loaded on the conveyor in front of the Autoclave load/unload side-hinged door~~, which is located near a fume hood~~. Once each waste bin is loaded a hydraulic lift is used to lift the waste bin onto the chain conveyor. The waste bins are moved by the chain conveyor to their selected position in the Autoclave.

14.9.1.5 Gates

14.9.1.5.1. The Autoclave is equipped with a side-hinged, hydraulic operated load/unload door that is also six feet in diameter. The door is equipped with an O-ring so that a positive seal is made when it is shut. ~~The door is located near a fume hood.~~ It is at this location that wastes are loaded into the 64.7 cubic foot waste bins.

14.9.1.6. Pumps and Transfer Lines

14.9.1.6.1. The autoclave uses a pump and transfer line to move condensate generated by the two condensers and steam traps located along the bottom of the Autoclave. As condensate is generated it is collected in a 175-gallon transfer tank. When full, the contents of this tank are pumped to one of two 1,000 gallon less than 90-day accumulation tanks which are used to store condensate.

14.9.1.7. Sump Pump

14.9.1.7.1. There are no sump pumps associated with the Autoclave operation.

14.9.1.8. Tanks and Containers

14.9.1.8.1. Condensate generated from the cooling and drying of gases evacuated from the Autoclave by use of the steam eductor are first accumulated in a 175-gallon transfer tank and intermittently transferred to one of two 1,000-gallon tanks that are operated as < 90-day accumulation tanks. Once full, the contents of the tank are agitated for 30 minutes and a sample taken and screened for chemical agent; if the results are less than the Waste Control Limit (WCL) the condensate is transferred to an off-site Subtitle C TSDF. If the analytical results show agent concentrations greater than the WCL, the tank's contents

are treated with decontamination solution and reanalyzed. Additional analyses are performed to identify required Land Disposal Restriction (LDR) notifications.

14.9.1.9. Feed System

14.9.1.9.1. Secondary Waste drums to be treated in the Autoclave are opened underneath the fume hood located near the side-hinged load/unload door. The content of each drum is then transferred into a lined waste bin using a crane. Once full the waste bin is lifted onto a chain conveyor by a hydraulic lift and moved into the Autoclave. The weight specified on the drums (total weight) is the basis for batch process weight for each waste bin and will documented in the operating record. Alternatively, instead of transferring wastes to the waste bins, select Secondary Wastes may be processed in the Autoclave in their storage container (i.e., drum) as specified in permit conditions found in Module VIII.

14.9.1.10. Instrumentation

14.9.1.10.1. The Autoclave is equipped with pressure and temperature sensors that allow operations to be managed by a Programmable Logic Controller (PLC), and an ACAMS and DAAMS station that is used to verify the successful treatment of each batch of Secondary Waste treated. The PLC performs automatic decontamination control that includes pre-treatment vacuum, pressurization and heat soak, vent, post-treatment vacuum, and air purge. The operator selects the desired treatment temperature and temperature soak time. The PLC controls the steam pressure in the Autoclave which controls the temperature. The PLC also allows for process data recording so that process parameters associated with each batch of waste treated can be reviewed and archived.

14.9.1.10.2. The control system provides the following information to the operators:

- Boiler status and/or alarm
- Boiler pressure
- Cooling tower status and/or alarm
- Cooling tower pump status
- Condenser outlet gas temperature
- Condensate pump status
- Refrigeration unit status
- Autoclave vessel temperature
- Imbedded thermocouple temperatures
- Autoclave pressure
- Autoclave process sequence/status

14.9.1.11. Electrical System

14.9.1.11.1. The electrical system powers condensate pumps, igloo lighting, agent monitors, igloo air handlers, the carbon filter system induced draft fan, Autoclave instrumentation, and the PLC that controls Autoclave operations.

14.9.1.11.2. Commercial power is provided. An uninterruptable power supply (UPS) is provided to supply power to the systems referenced in Condition 14.9.7.2 for five seconds, after which power is restored by a natural gas fired emergency generator. Attachment 9 (Contingency Plan) provides detailed information regarding the backup power systems.

14.9.1.12. Heating, Ventilation, and Air Conditioning System (HVAC)

14.9.1.12.1 The Autoclave resides within DCD Area 10, Igloo 1631. General-area heating, ventilation and air conditioning of Igloo 1631 is provided separate of the carbon adsorption filtration system.

14.9.1.13. Fire Protection System

14.9.1.13.1. Type ABC hand-held fire extinguishers are staged in Igloo 1631 (See Attachment 9 Contingency Plan).

14.9.1.14. Alarm and Communications Systems

14.9.1.14.1. Igloo 1631 and the adjacent support building are equipped with a communication system that is similar to that of the TOCDF site to include local area network phone service and Public Announcement (PA) system, hand-held radios and cell phones. These systems are available to alert employees of emergencies or to summon assistance.

14.9.2. General System Operation

14.9.2.1. The Autoclave is a batch feed system. The process begins with the transfer of Secondary Waste drums ~~from their storage containers~~ to the 64.7 cubic foot Autoclave waste bins. The Secondary Waste drums are transferred to the waste bins using a crane. This transfer occurs near the side-hinged load/unload Autoclave door. ~~Near this door is a fume hood that vents to an activated carbon filter system located adjacent to Igloo 1631. The fume hood controls agent emissions released from the waste drums as they are opened and during the time their contents are transfer to the waste bins. Alternatively, instead of transferring wastes to the waste bins, select Secondary Wastes may be processed in the Autoclave in their storage container (i.e., drum) as specified in permit conditions found Module VIII.~~

14.9.2.2. A liner is placed into each waste bin prior to the Secondary Waste being placed into the bin. Once full, a thermocouple is inserted into the heaviest drum of each type of waste in each waste bin or other configuration based on results obtained during shakedown and approved by Executive Secretary. These thermocouples allow for the temperature of the bins or drum's content to be continuously monitored throughout the treatment process.

14.9.2.3. The waste bins are placed onto a hydraulic lift prior to being filled. When filled the lift raise the waste bin onto a chain conveyor that runs the interior length of the Autoclave and the chain conveyor moves the filled waste bin into the Autoclave. The Autoclave can hold up to four waste bins.

14.9.2.4. Once the batch of waste is loaded into the Autoclave the door is closed and the PLC controlled treatment process begins. The treatment process consists of the following discrete steps; 1) pre-treatment evacuation, 2) ramp-to-temperature, 3) temperature soak, 4) post-treatment evacuation, 5) post-treatment cooling and drying, 6) Autoclave headspace equilibration, and 7) Autoclave headspace monitoring.

14.9.2.5. The pre-treatment vacuum is accomplished using the steam eductor that evacuates the Autoclave to a pressure of approximately ten inches of Mercury (Hg). The purpose of the pre-treatment vacuum is to remove the air from the Autoclave which allows for a quick and efficient penetration of steam throughout the load to be processed. Upon

completion of this process step steam is introduced into the Autoclave, beginning the ramp-to-temperature step.

14.9.2.6. Multiple purge, evacuation, and re-heat cycles are used throughout the ramp-to-temperature step to minimize the time it takes the wastes within the Autoclave to reach the treatment temperature. The number of purge, evacuation, and re-heat cycles used during the ramp-to-temperature process step varies with the type of waste being processed.

14.9.2.7. The temperature soak does not begin until the temperature read by each of the thermocouples is equal to or greater than the treatment temperature set point. If any thermocouple fails, the thermocouple will be repaired and the contents of the associated waste bin will be retreated.

14.9.2.8. Upon completion of the temperature soak process step, the PLC activates a post-treatment vacuum process step. This process step removes excess moisture from the waste load.

14.9.2.9. A cooling and drying step follows the post-treatment evacuation step. During this step, ambient air is drawn from Igloo 1631, and moved through and out of Autoclave by an approximate 300 cubic foot per minute fan. The air exhausting the Autoclave is vented through the carbon filter system.

14.9.2.10. The cooling and drying process step is stopped by closing the Autoclave air inlet and outlet valves. The air within the sealed Autoclave is then allowed to equilibrate. Agent monitoring of the interior of the Autoclave begins a minimum fifteen minutes after the flow of cooling and drying air is stopped per Module VIII, Table VIII A. Agent monitoring is performed using an ACAMS and associated DAAMS station. Agent monitoring results are used to confirm that the autoclave atmosphere is safe to open the door.

14.9.2.11. Upon completion of successful treatment, the wastes bins are removed from the Autoclave and transferred via forklift out of Igloo 1631 to a pre-positioned roll-off. The waste bin liners (containing the treated Secondary Waste) are removed from the waste bins and placed into roll-offs. Full roll-offs are transferred to an off-site Subtitle C TSDF.

14.9.3. System Startup

14.9.3.1. The Autoclave is PLC controlled. To begin operations requires; 1) the steam pressure of the boiler to be sufficient to support Autoclave operations, 2) proper operation of the condensers used to dry gases vented to the carbon filter system, and 3) operation of the carbon filter system.

14.9.4. Feed

14.9.4.1. The Autoclave is a batch feed operation. Secondary wastes are fed to the Autoclave either by transferring the wastes from their original storage containers (i.e., 1 to 110 gallon drums) to lined 64.7 cubic foot waste bins, or by placing full drums of waste directly in the waste bins. The weight specified on the drums (total weight) is the basis for batch process weight for each waste bin and will be documented in the operating record. The types of Secondary Wastes that may be treated directly in their storage containers are identified in permit conditions found in Module VIII.

14.9.5. Interlocks

14.9.5.1. Autoclave operations include interlocks that; 1) prevent the load/unload door from being opened during operations; 2) prevent the start of Autoclave operations if the condensers which are used to cool and condense gases removed from the Autoclave during the pre- and post-treatment evacuation process steps are not functioning properly, and 3) prevent the start of Autoclave operations if any of the thermocouples which are placed in the waste loads and used to initiate the start of the treatment timer are not functioning properly.

14.9.6. System Shutdown (Normal)

14.9.6.1. The Autoclave is shutdown by the PLC after the treatment of each waste batch. The boiler may be shut down when the Autoclave is not in operation.

14.9.7. Emergency Shutdown

14.9.7.1. Autoclave operations are locally controlled which allows the system to be shutdown by the operator should abnormal conditions develop. The hydraulic load/unload door, carbon filter system and associated spare filter, and emergency generator allow for Autoclave operations to be interrupted during any of the previously described process steps without a resulting release of hazardous waste to the environment.

14.9.7.2. During emergency operations resulting from a loss of commercial power, operation of the carbon filter system induced draft fan, agent monitoring equipment, and Autoclave PLC and associated instruments is maintained by an UPS and emergency generator.

14.9.8. Monitoring Procedures

14.9.8.1. Autoclave operations are monitored by the PLC to ensure complete destruction of the agent contaminating the Secondary Waste articles. Instrumentation used to ensure destruction of the agent includes pressure monitors for Autoclave internal pressure, temperature monitors, in the form of thermocouples, which are placed in the waste loads, and an ACAMS used to confirm that the autoclave atmosphere is safe to release.

14.9.8.2. ACAMS are used to monitor the interior of the Autoclave upon completion of the treatment process. ACAMS monitoring is performed prior to the treated waste being removed from the Autoclave. These results are used to determine the applicable waste handling practices.

14.9.8.3. The Autoclave system uses two types of control equipment to minimize emissions of organic compounds to the environment. Gases removed from the Autoclave during the pre- and post- treatment evacuation process steps first pass through a glycol cooled condenser, then through a refrigerant condenser, and finally through a fixed bed carbon filter. The fixed bed carbon filter is the primary method of controlling emissions to the environment.

14.9.8.4. The carbon filter system consists of a primary and secondary filter system. Each system includes two carbon beds. Agent monitoring using ACAMS is conducted at the mid-bed location and at the exhaust stack.

14.9.8.5. The carbon filter systems are additionally equipped with a pressure gauge that is located in a readily accessible location so that it can be verified that the carbon filters are being operated at a negative pressure when in use.

14.9.9. Waste Identification

14.9.9.1. The Secondary Wastes treated in the Autoclave includes DPE Suits contained in plastic bags, wood and LSS air hoses. Additional waste types may be allowed following function testing approved by the Executive Secretary. These waste matrices may include the following waste codes; P999, F999, D002, D003, D004, D005, D006, D007, D008, D010, and D011.

14.9.10. Waste Throughput

14.9.10.1. The waste throughput rates and process parameters are established through results of a function test executed per a test plan approved by the Executive Secretary. Autoclave operating parameters, including waste feed are specified in Module VIII.

14.9.11. Inspection

14.9.11.1. The Autoclave system, including ancillary equipment will be inspected as specified in Attachment 5.

14.9.12. Closure

14.9.12.1. Partial Closure

14.9.12.1.1. Partial closure does not apply to the autoclave. Following final closure of the autoclave the TODF will submit in writing to the Executive Secretary a request for partial closure of Igloo 1631. After approval of partial closure, Igloo 1631 will be turned back over to DCD Area 10 for final closure.

14.9.12.2. Final Closure

14.9.12.2.1. Final closure of the autoclave will be performed in compliance with R315-8-7 and this permit. Final closure of Igloo 1631 will be accomplished via DCD Area 10 Closure Plan.

14.9.13. Mitigative Design and Operating Standards

14.9.13.1. The following section describes waste constituent releases to the environment (air, soil, and water), the potential impacts of such releases, and the location features of the TOCDF that will mitigate these releases.

14.9.13.2 Containment System

14.9.13.2.1. Containment systems associated with the igloo housing the Autoclave include; 1) the epoxy paint sealed floor of Igloo 1631, and 2) the gutters running down each side of the length of Igloo 1631 that have been diked to prevent liquid wastes from escaping the igloo.

14.9.13.2.2. The containment system associated with the Autoclave include a secondary containment tray which is positioned at the lip of the junction between the Autoclave vessel and the

load/unload door. This containment tray is used to capture any liquid condensate that may drain from the Autoclave when it is opened upon completion of the treatment process.

14.9.13.3. Site Air Conditions

14.9.13.3.1. See Section 14.3.7.4.

14.9.13.4. Topography

14.9.13.4.1. See Section 14.3.7.5.

14.9.13.5. Meteorological and Atmospheric Conditions

14.9.13.5.1. See Section 14.3.7.6.

14.9.13.6. Air Quality

14.9.13.6.1. See Section 14.3.7.7.

14.9.13.7. Prevention of Air Emissions

14.9.13.7.1. Emissions to air of organic compounds from the Autoclave are controlled using fixed-bed carbon filter system. ~~Emissions collected by the fume hood located near the Autoclave load/unload door and the enclosures that contain the condensate accumulation tanks are also vented to the carbon filter system.~~ The carbon filter system is shared with the DVS/DVSSR treatment units. See 14.8.1.1.3 for more description.

14.9.13.8. Operating Standards

14.9.13.8.1. The operating standards applicable for Autoclave operations are specified in Module VIII of this permit.

14.9.13.9. Site Hydrologic Conditions

14.9.13.9.1. A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.9.13.10. Migration of Waste Constituents

14.9.13.10.1. The migration of waste constituents is controlled by the use of the fixed bed carbon filter system that captures gases vented from Autoclave operations, the sealed floor of Igloo 1631 and the enclosed space created by placing the Autoclave inside the igloo that prevents waste constituents from migrating to ground water, or being released to the environment during Autoclave loading and unloading operations.

14.9.13.10.2. Releases to the environment while loading treated wastes into the roll-off are controlled by the use of waste bin liners that prevent treated waste from being spilled during roll-off loading operations and by the ACAMS results associated with each batch of Autoclave-treated waste.

Table 14-3-1
LIST OF BULK DRAIN STATION SENSORS AND CRITICAL INTERLOCKS

Sensor Tag	Sensor Type	Functional Description
49-1-P1 (Line A)[a] 49-2-P1 (Line B)[a]	Retroreflector Beam Sensor	Indicates the tray is on the BDS Transfer Conveyor, shifts Transfer Conveyor to slow speed (Start of BDS).
49-1-P2 (Line A)* 49-2-P2 (Line B)*	Inductive Proximity Sensor	Indicates the cradle is at the punch position.[b]
49-1-P3 (Line A)* 49-2-P3 (Line B)*	Inductive Proximity Sensor	Indicates the TC cradle is at the agent drain position AND indicates the TC cradle is in the first vent punch position.
49-1-P4 (Line A)* 49-2-P4 (Line B)*	Inductive Proximity Sensor	Indicates the TC cradle is in the second vent punch position AND indicates the TC cradle is in the HTS spray position.
49-1-P5 (Line A) 49-2-P5 (Line B)	Retroreflector Beam Sensor	Indicates the tray is transferring to the next Hydraulic Conveyor.
49-1-P6 (Line A) 49-1-P6 (Line B)	Inductive Proximity Sensor	Indicates the TC cradle is in the rinsate drain position.
49-1-102A1-102A4 (Line A)* 49-2-102A1-102A4 (Line B)*	Inductive Proximity Sensors	Indicate the Transfer Conveyor Lift Cylinders are extended.
49-1-102B1-102B4 (Line A) 49-2-102B1-102B4 (Line B)	Inductive Proximity Sensors	Indicate the Transfer Conveyor Lift Cylinders are retracted.
49-1-103A (Line A) 49-2-103A (Line B)	Inductive Proximity Sensor	Indicates the Punch Cylinder is extended.
49-1-103B (Line A) 49-2-103B (Line B)	Inductive Proximity Sensor	Indicates the Punch Cylinder is retracted.
49-1-104A (Line A)* 49-2-104A (Line B)*	Inductive Proximity Sensor	Indicates the Agent Drain Tube is fully extended.
49-1-104B (Line A)* 49-2-104B (Line B)*	Inductive Proximity Sensor	Indicates the Agent Drain Tube is fully retracted.
49-1-104C (Line A) 49-2-104C (Line B)	Inductive Proximity Sensor	Indicates the Agent Drain Tube comes in contact with heel or top of ton container.
49-1-106A1-A2 (Line A) 49-2-106A1-A2 (Line B)	Inductive Proximity Sensor	Indicates the Hold Down Cylinders are extended.
49-1-106B1-B2 (Line A) 49-2-106B1-B2 (Line B)	Inductive Proximity Sensor	Indicates the Hold Down Cylinders are retracted.
49-ZT-9104 (Line A) 49-ZT-9204 (Line B)	Rotational Count Encoders	Indicates Agent Drain Tube linear position and distance traveled.
66-ZS-9101A (Line A) 66-ZS-9201A (Line B)	Inductive Proximity Sensor	Indicates the HTS Spray Wand Cylinder is fully extended.
66-ZS-9101B (Line A)* 66-ZS-9201B (Line B)*	Inductive Proximity Sensor	Indicates the HTS Spray Wand Cylinder is fully retracted.
66-ZS-9101C (Line A) 66-ZS-9201C (Line B)	Inductive Proximity Sensor	Indicates the HTS Spray Wand Heel Detect.
66-ZT-9101 (Line A) 66-ZT-9201 (Line B)	Rotational Count Encoder	Indicates the HTS Spray Wand linear position and distance traveled.
66-ZS-9103A (Line A) 66-ZS-9203A (Line B)	Inductive Proximity Sensor	Indicated the HTS Rinsate Drain Tube Cylinder is fully extended.
66-ZS-9103B (Line A)* 66-ZS-9203B (Line B)*	Inductive Proximity Sensor	Indicated the HTS Rinsate Drain Tube Cylinder is fully retracted.
66-ZS-9103C (Line A) 66-ZS-9203C (Line B)	Inductive Proximity Sensor	Indicates the HTS Rinsate Drain Tube Heel Detect.
66-ZT-9103 (Line A) 66-ZT-9203 (Line B)	Rotational Count Encoder	Indicates HTS Rinsate Drain Tube linear position and distance traveled.

Table 14-3-1
LIST OF BULK DRAIN STATION SENSORS AND CRITICAL INTERLOCKS

Sensor Tag	Sensor Type	Functional Description

Notes:
[a] Sensor can be used to monitor throughput of munitions/bulk items.
[b] Interlocks MDM-GATE-101 and -102
* Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.
BDS = Bulk Drain Station

Table 14-4-1
MAXIMUM EXPLOSIVE WEIGHT IN EXPLOSIVE CONTAINMENT ROOM

	Normal Process Mode		Reject Process Mode	
Munitions (Explosive Type)	No. of Rounds/Burster In ECR	Explosive Weight In ECR (TNT_{Eq})	No. of Rounds/Burster in ECR	Explosive Weight In ECR (TNT_{Eq})
155mm/M104 and M110 (Tetrytol)	4	1.99	4	1.99
4.2-in./M2 and M2A1 (Tetrytol)	2	0.42	4	0.84

Note:

ECR = Explosive Containment Room

1. Based upon ECR design (ref: Section 14.4.1.4.2), the maximum quantity of explosive material allowed in an ECR is 15 lbs (trinitrotoluene equivalent (TNT_{Eq})). Therefore, in addition to the quantities identified above, the TOCDF may have additional in-process munitions, other explosive materials in the ECR provided that the total quantity in the ECR does not exceed 15 lbs (TNT equivalent). TNT Equivalence is based on the specific explosive type's brisance as compared to TNT as reported in Army Technical Manual TM 9-1300-214. A mustard 155mm projectile burster contains 0.414 of tetryl/TNT/tetrytol compound with a TNT equivalent of 1.2 $lbs._{TNT}$/pound

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
P-1*	Inductive Proximity Sensor, 10mm range	Indicates the munition is in the Transfer Station.
102B	Inductive Proximity Sensor, 10mm range	Indicates the Transfer Conveyor Trolley is in its home position.
103A	Inductive Proximity Sensor, 5mm range	Indicates the saddle is in the load position.
103B	Inductive Proximity Sensor, 5mm range	Indicates the saddle is in the unload position.
103C	Inductive Proximity Sensor, 10mm range	Indicates the Index Table is indexed at proper position to line up with each other.
110A/B*	NAMCO Switch	Senses when the burster probe is extended or retracted.
P-2*	Inductive Proximity Sensor, 35mm range	Indicates the munition is in correct position to begin operation at the NCRS.
P-21*	Fiber Optic Sensor	Indicates the fuze/nose closure is in the Chuck Jaws when the NCR carriage is fully retracted.
P-22	Fiber Optic Sensor	Indicates the burster is in position for unscrewing fuzes from bursters (M2).
201B*	Inductive Proximity Sensor, 5mm range	Indicates the Projectile Clamp Cylinder is extended and munition is clamped.
201C	Inductive Proximity Sensor, 5mm range	Indicates the Projectile Clamp Cylinder is retracted and the munition is unclamped.
202A[1]	Inductive Proximity Sensor	Indicates the NCR Carriage is fully extended.
202B[1]	Inductive Proximity Sensor	Indicates the NCR Carriage is fully retracted.
202C[1]	Inductive Proximity Sensor, 5mm range	Indicates the NCR Carriage is in the mid-position.
PS-203A	Pressure Switch	Indicates the Hydraulic Chuck Jaws are fully extended or clamped on a nose closure/fuze.
PS-203B	Pressure Switch	Indicates the Hydraulic Chuck Jaws are fully retracted.
PS-204A*	Pressure Switch	Indicates the Chuck Motor (spindle) has stalled.
206A	Inductive Proximity Sensor	Indicates the Gripper Slide Cylinder is fully extended and the Gripper Slide Assembly is in the "up" position.
206B	Inductive Proximity Sensor	Indicates the Gripper Slide Cylinder is fully retracted and the Gripper Slide Assembly is in the down position.
207A	Inductive Proximity Sensor	Indicates the Booster/Burster Gripper Cylinder is fully extended, jaws "open."
P-3*	Inductive Proximity Sensor, 10mm range	Indicates the projectile is in position at the MPRS.
P-31*	Fiber Optic Sensor	Indicates the fuze and burster are conveyed to the DFS feed gate to cause the feed gate to cycle.
301A[1]	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully extended and the V-plate is raised.
301B[1]	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully retracted and the V-plate is "down."
302A	Inductive Proximity Sensor	Indicates the Projectile Hold Down Cylinder is extended.
302B	Inductive Proximity Sensor	Indicates the Projectile Hold Down Cylinder is retracted.
303A[1]	Inductive Proximity Sensor	Indicates the MPR Carriage Cylinder is extended and carriage is in "home" position.
303B[1]	Inductive Proximity Sensor	Indicates the MPR Carriage Cylinder is retracted and carriage is in fully "forward" position.
303C[1]	Inductive Proximity Sensor, 5mm range	Indicates the MPR Carriage is in mid-position.
303D[1]	Inductive Proximity Sensor, 5mm	Indicates the MPR Carriage is in position to begin bakelite

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
	range	fuze well cup cutting sequence (for M110 projectiles only).
304A[1]	Inductive Proximity Sensor	Indicates the Fuze Well Cup Collet Release Cylinder is extended to release Collet.
304B[1]	Inductive Proximity Sensor	Indicates the Fuze Well Cup Collet Release Cylinder is retracted to set the Collet.
304C[1]	Inductive Proximity Sensor	Indicates BRAD is extended to rotate burster.
308A[1]	Inductive Proximity Sensor, 5mm range	Indicates the Air-Probe Cylinder is extended (M121A1 only).
308B[1]	Inductive Proximity Sensor, 5mm range	Indicates the Air-Probe Cylinder is retracted (M121A1 only).
P-4*[1]	Inductive Proximity Sensor, 35mm range	Indicates a projectile is in correct position at the BRS.
401A[1]	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully extended and the V-plate is "raised."
401B[1]	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully retracted and the V-plate is "down."
402A[1]	Inductive Proximity Sensor, 5mm range	Indicates the BRS Carriage is fully extended (forward).
402B[1]	Inductive Proximity Sensor, 5mm range	Indicates the BRS Carriage is in the retracted position.
402C[1]	Inductive Proximity Sensor, 10mm range	Indicates the BRS Carriage has retracted to the mid-position to allow the burster to be gripped by the Burster Gripper.
403A*[1]	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder is fully extended.
403B*[1]	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder has fully retracted to the "failed to Extract Burster" position.
403C[1]	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder head has retracted part way to the "Air Off" position and extended part way to the "Collet Released" position.
404A[1]	Inductive Proximity Sensor	Indicates the Burster Conveyor Lift Cylinder is fully extended and the Burster Conveyor is in the "lowered" position.
404B[1]	Inductive Proximity Sensor	Indicates the Burster Conveyor Lift Cylinder is fully retracted and the Burster Conveyor is in the "raised" position.
405A[1]	Inductive Proximity Sensor	Indicates the Burster Gripper Cylinder is extended and jaws are "closed."
405B[1]	Inductive Proximity Sensor	Indicates the Burster Gripper Cylinder is retracted and jaws are "open."
406A[1]	Inductive Proximity Sensor, 10mm range	Indicates the Burster Gripper Assembly is in position over the burster.
406B[1]	Inductive Proximity Sensor, 10mm range	Indicates the Burster Gripper Assembly is in its "Home" position over the BSR chute.
PMD-ENC-1*		Transfer Conveyor Optical Encoder (20904)
300V1[1]	2-way solenoid valve, normally closed	Used to provide 100 psi compressed air to the MPRS Air Blast Tube.
300V2[1]	2-way solenoid valve, normally closed	Used to provide 300 psi compressed air to the MPRS Air Blast Tube.
308VA[1]	4-way, two position, solenoid valve	Used to provide 100 psi compressed air to extend and retract the MPRS Air-Probe (M121A1).
400V1[1]	2-way solenoid valve, normally closed	Used to provide 100 psi compressed air to the BRS Delta-P Head Assembly (and 300 psi compressed air in when

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
		operated with 400V3).
400V2[1]	2-way solenoid valve, normally closed	Used to vent 100 psi or 300 psi compressed air from the Delta-P Head Assembly.
400V3[1]	2-way solenoid valve, normally closed	Used to provide 300 psi compressed air to the BRS Delta-P Head Assembly.
PLS-4*[1] (PMD-101)	Inductive Proximity Sensor	Indicates that the pusher is at the home position. This information is also used to reset the pusher position optical encoder.
RSM-ENC-1*[1] (PMD-101)	Optical Encoder	BSR Pusher Optical Encoder
41-2-ZT[1] (PMD-102)	Pusher Cylinder Linear Position Transducer	Indicates position of burster pusher hydraulic cylinder.
PLS-7* PLS-8* PLS-9*	Inductive Proximity Sensor	All three switches (PLS-7, 8, and 9) are installed and used only during Burster Size Reduction operations. Each switch indicates that the burster is present in that particular zone of the burster chute. The system requires that the burster must make two of three switches before they are indexed forward to the shear station.

Notes:
BRAD = Burster Rotating Adapter Device
BRS = Burster Removal System
BSR = Burster Size Reducer
MPR = Miscellaneous Parts Removal
MPRS = Miscellaneous Parts Removal Station
NCR = Nose Closure Removal
NCRS = Nose Closure Removal System
PLC = Programmable Logic Controller
Psi = Pounds per Square Inch

- = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.
- [1] Not used during 4.2 inch HT mortar processing.

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS, 155 mm H Projectile MDM-101, MDM-102 & MDM-103[a]

Sensor Type	Sensor Tag[b]	Location of Sensor	Functional Description
Proximity Detector	45-1-100C	Corresponding MDM Index Table	Indicates the MDM's Index Table is properly aligned within the MDM.
	45-2-100C		
	45-3-100C		
NAMCO Switch	45-1-101A/B	Corresponding MDM Index Table	Senses when projectile slide cylinder #1 is extended/retracted.
	45-2-101A/B		
	45-3-101A/B		
Proximity Detector	45-1-101C*	MDM-101 Sta. 1	Senses when a munition is at the LUS.
	45-2-101C*	MDM-102 Sta. 1	
	45-3-101C*	MDM-103 Sta. 1	
Fiber Optic Sensor	45-1-101D*	MDM-101 Sta. 1	Senses the presence of a crimped burster well at the LUS during the reinsert mode.
	45-2-101D*	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-101D*		
NAMCO Switch	45-1-401A/B	MDM-101 Sta. 4	Senses when projectile slide cylinder #4 is extended/retracted.
	45-2-401A/B	MDM-102 Sta. 4	
	45-3-401A/B	MDM-103 Sta. 4	
NAMCO Switch	45-1-402A/B	MDM-101 Sta. 4	Senses when the projectile clamp cylinder is extended/ retracted.
	45-2-402B	MDM-102 Sta. 4	Senses when the projectile clamp is retracted
	45-3-402B	MDM-103 Sta. 4	Senses when the projectile clamp is retracted
Fiber Optic Sensor	45-ZS-9203	MDM-102 Sta. 4	Senses projectile deformation
	45-ZS-9303	MDM-103 Sta. 4	Senses projectile deformation
Pressure Switch	45-1-402C	MDM-101 Sta. 4	Senses when the projectile clamps are clamped.
	45-2-402C	MDM-102 Sta. 4	
	45-3-402C	MDM-103 Sta. 4	
NAMCO Switch	45-1-403A/B	MDM-101 Sta. 4	Senses when the boring head feed cylinder is fully extended/retracted.
Hall Effect Switch	45-ZS-9201A/B	MDM-102 Sta. 4	Senses when the burster probe cylinder is fully extended/retracted
	45-ZS-9301A/B	MDM-103 Sta. 4	
NAMCO Switch	45-1-404A/B*	MDM-101 Sta. 4	Senses when the burster probe is extended or retracted.
	45-2-404A/B*	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-404A/B*	Inactive	
NAMCO Switch	45-1-406A/B	MDM-101 Sta. 4	Senses when the plug transition chute is extended/retracted.
	45-2-406A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-406A/B	Inactive	
Vaccon Vacuum Switch	45-1-407	MDM-101 Sta. 4	Verifies that a plug is present in the socket assembly.
	45-2-407	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-407	Inactive	
NAMCO Switch	45-1-501A/B	MDM-101 Sta. 5	Senses when the projectile slide cylinder #5 is extended/retracted.
	45-2-501A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-501A/B	Inactive	
NAMCO Switch	45-1-502A/B	MDM-101 Sta. 5	Senses when the projectile lift cylinder is extended/retracted.
	45-2-502A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-502A/B	Inactive	
NAMCO Switch	45-1-503A/B 1&2	MDM-101 Sta. 5	Senses when the carriage cylinder is extended/retracted.
Hall Effect Switch	45-ZS-9202A	MDM-102 Sta. 4	Senses when the punch probe cylinder is extended
	45-ZS-9302A	MDM-103 Sta.4	
	45-ZS-9202B	MDM-102 Sta. 4	Senses when the punch probe cylinder is retracted
	45-ZS-9302B	MDM-103 Sta.4	
NAMCO	45-2-403B	MDM-102 Sta. 4	Senses when the punch cylinder is retracted

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS, 155 mm H Projectile MDM-101, MDM-102 & MDM-103[a]

Sensor Type	Sensor Tag[b]	Location of Sensor	Functional Description
Switch	45-3-403B	MDM-103 Sta.4	
NAMCO	45-1-504A/B 1&2	MDM-101 Sta. 5	Senses when the pull cylinder is extended/retracted.
	45-2-403A*	MDM-102 Sta. 4	Senses when the punch cylinder is extended
	45-3-403A*	MDM-103 Sta. 4	
	45-2-504A1/B1	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-504A1/B1		
	45-2-504B2		
	45-3-504B2		
Proximity Detector	45-1-504C*	MDM-101 Sta. 5	Senses burster well when pulled.
	45-2-504C*	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-504C*		
NAMCO Switch	45-1-505A/B	MDM-101 Sta. 5	Senses when the collet set cylinder is extended/retracted.
	45-2-505A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-505A/B		
NAMCO Switch	45-1-505C	MDM-101 Sta. 5	Senses when the collet is set in the burster well.
	45-2-505C	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-505C		
NAMCO Switch	45-1-506A/B	MDM-101 Sta. 5	Senses when the drip pan cylinder (pull Station) is extended/retracted.
	45-2-506A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-506A/B		
NAMCO Switch	45-1-507A/B	MDM-101 Sta. 5	Senses when the burster well chute cylinder is extended/retracted.
	45-2-507A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-507A/B		
NAMCO Switch	45-1-509A/B	MDM-101 Sta. 5	Senses when the drip pan cylinder (Drain Station) is extended/retracted.
	45-2-509A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-509A/B		
NAMCO Switch	45-1-510A/B*	MDM-101 Sta. 5	Senses when the drain tube cylinder is extended/retracted.
	45-2-510A/B*	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-510A/B*		
Proximity Sensor	45-1-510C*	MDM-101 Sta. 5	Senses when the drain tube is at the bottom of the munition.
	45-2-510C*	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-510C*		
NAMCO Switch	45-1-601A/B	MDM-101 Sta. 6	Senses when the projectile slide cylinder #6 is extended/retracted.
	45-2-601A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-601A/B		
NAMCO Switch	45-1-602A/B	MDM-101 Sta. 6	Senses when the burster well lift cylinder is extended/retracted.
	45-2-602A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-602A/B		
NAMCO Switch	45-1-603A/B	MDM-101 Sta. 6	Senses when the collet set cylinder is extended/retracted.
	45-2-603A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-603A/B		
Pressure Switch	45-1-603C	MDM-101 Sta. 6	Senses when the collet is set in the burster well.
	45-2-603C	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-603C		
NAMCO Switch	45-1-604A/B	MDM-101 Sta. 6	Senses when the burster well crimp cylinder is extended/retracted.
	45-2-604A/B	Inactive	Not used when MDM is configured for 155-mm Mustard Projectiles
	45-3-604A/B		

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS, 155 mm H Projectile MDM-101, MDM-102 & MDM-103[a]

Sensor Type	Sensor Tag[b]	Location of Sensor	Functional Description

Notes:
[a] Currently, MDM-101 is configured to process 4.2-inch mortars whereas MDM-102 and MDM-103 are configured to process 155-mm projectiles. Because the MDM processing of 155-mm projectiles is limited to the burster well punch step only, the majority of the instruments at MDM-102 and MDM-103 are not active, as indicated in the shaded cells of this table.

[b] Sensor tags specify which MDM the instrument serves (45-1-XXXA/B or C is at MDM-101, 45-2-XXXA/B or C is at MDM-102, etc.)

LUS = Load/Unload Station
MDM = Multipurpose Demilitarization Machine
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

Table 14-5-1a
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS, 4.2" HT Mortars MDM-101, MDM-102 & MDM-103[a]

Sensor Type	Sensor Tag[b]	Location of Sensor	Functional Description
Proximity Detector	45-1-100C	Corresponding MDM Index Table	Indicates the MDM's Index Table is properly aligned within the MDM.
	45-2-100C		
	45-3-100C		
NAMCO Switch	45-1-101A/B	Corresponding MDM Index Table	Senses when projectile slide cylinder #1 is extended/retracted.
	45-2-101A/B		
	45-3-101A/B		
Proximity Detector	45-1-101C*	MDM-101 Sta. 1	Senses when a munition is at the LUS.
	45-2-101C*	MDM-102 Sta. 1	
	45-3-101C*	MDM-103 Sta. 1	
NAMCO Switch	45-1-402A/B	MDM-101 Sta. 4	Senses when the projectile clamp cylinder is extended/ retracted.
NAMCO Switch	45-1-403A/B	MDM-101 Sta. 4	Senses when the boring head feed cylinder is fully extended/retracted.
NAMCO Switch	45-1-404A/B*	MDM-101 Sta. 4	Senses when the burster probe is extended or retracted.
NAMCO Switch	45-1-406A/B	MDM-101 Sta. 4	Senses when the plug transition chute is extended/retracted.
Vaccon Vacuum Switch	45-1-407	MDM-101 Sta. 4	Verifies that a plug is present in the socket assembly.
NAMCO Switch	45-1-501A/B 45-2-501A/B 45-3-501A/B	MDM-101 Sta. 5 MDM-102 Sta. 5 MDM-103 Sta. 5	Senses when the projectile slide cylinder #5 is extended/retracted.
NAMCO Switch	45-1-502A/B 45-2-502A/B 45-3-502A/B	MDM-101 Sta. 5 MDM-102 Sta. 5 MDM-103 Sta. 5	Senses when the projectile lift cylinder is extended/retracted.
NAMCO Switch	45-1-503A/B 1&2	MDM-101 Sta. 5	Senses when the carriage cylinder is extended/retracted.
	45-2-503A/B 1&2	MDM-102 Sta. 5	
	45-3-503A/B 1&2	MDM-103 Sta. 5	
NAMCO	45-1-504A/B 1&2	MDM-101 Sta. 5	Senses when the pull cylinder is extended/retracted.
	45-2-504A/B 1&2	MDM-102 Sta. 5	
	45-3-504A/B 1&2	MDM-103 Sta. 5	
Proximity Detector	45-1-504C*	MDM-101 Sta. 5	Senses burster well when pulled.
	45-1-504C*	MDM-102 Sta. 5	

Table 14-5-1a
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS, 4.2" HT Mortars MDM-101, MDM-102 & MDM-103[a]

Sensor Type	Sensor Tag[b]	Location of Sensor	Functional Description
	45-1-504C*	MDM-10 Sta. 5	
NAMCO Switch	45-1-505A/B	MDM-101 Sta. 5	Senses when the collet set cylinder is extended/retracted.
	45-2-505A/B	MDM-102 Sta. 5	
	45-3-505A/B	MDM-103 Sta. 5	
NAMCO Switch	45-1-505C	MDM-101 Sta. 5	Senses when the collet is set in the burster well.
	45-2-505C	MDM-102 Sta. 5	
	45-3-505C	MDM-103 Sta. 5	
NAMCO Switch	45-1-506A/B	MDM-101 Sta. 5	Senses when the drip pan cylinder (pull Station) is extended/retracted.
	45-2-506A/B	MDM-102 Sta. 5	
	45-3-506A/B	MDM-103 Sta. 5	
NAMCO Switch	45-1-507A/B	MDM-101 Sta. 5	Senses when the burster well chute cylinder is extended/retracted.
	45-2-507A/B	MDM-102 Sta. 5	
	45-3-507A/B	MDM-103 Sta. 5	
NAMCO Switch	45-1-509A/B	MDM-101 Sta. 5	Senses when the drip pan cylinder (Drain Station) is extended/retracted.
	45-2-509A/B	MDM-102 Sta. 5	
	45-3-509A/B	MDM-103 Sta. 5	
NAMCO Switch	45-1-510A/B*	MDM-101 Sta. 5	Senses when the drain tube cylinder is extended/retracted.
	45-2-510A/B*	MDM-102 Sta. 5	
	45-3-510A/B*	MDM-103 Sta. 5	
Proximity Sensor	45-1-510C*	MDM-101 Sta. 5	Senses when the drain tube is at the bottom of the munition.
	45-2-510C*	MDM-102 Sta. 5	
	45-2-510C*	MDM-103 Sta. 5	

Notes:
[a] MDM configuration for 4.2" HT Mortar processing. Note MDM-101 includes a functioning station 4 (bore station) to allow removal of burster wells that are welded in-place. Station 4 is not used on MDM-102 and -103. Station 6 is not used on any MDM since 4.2" HT burster well are not crimped or placed back into the drained mortar. Burster wells are removed and transferred to an accumulation container which is fed to the MPF with each tray of 4.2" Mortars.

[b] Sensor tags specify which MDM the instrument serves (45-1-XXXA/B or C is at MDM-101, 45-2-XXXA/B or C is at MDM-102, etc.)

LUS = Load/Unload Station
MDM = Multipurpose Demilitarization Machine
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

Table 14-5-2
MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE CRITICAL SENSORS AND INTERLOCKS

Sensor Tag	Sensor Type	Functional Description	Interlock
45-10-25-154	Proximity Detector	Senses munition tray at Line A, MDM-101	Conveyor MDM-CNVP-101
45-10-25-170	Proximity Detector	Senses munition tray at Line A, MDM-102	Conveyor MDM-CNVP-103
45-10-25-160	Proximity Detector	Senses munition tray at Line A, MDM-103	Conveyor MDM-CNVP-105
45-10-25-254	Proximity Detector	Senses munition tray at Line B, MDM-101	Conveyor MDM-CNVP-102
45-10-25-270	Proximity Detector	Senses munition tray at Line B, MDM-102	Conveyor MDM-CNVP-104
45-10-25-260	Proximity Detector	Senses munition tray at Line B, MDM-103	Conveyor MDM-CNVP-106

Table 14-6-1
Reserved